



## SeaWiFS Technical Report Series

*Stanford B. Hooker, Editor  
Goddard Space Flight Center, Greenbelt, Maryland*

*Elaine R. Firestone, Technical Editor  
General Sciences Corporation, Laurel, Maryland*

## Volume 43, SeaWiFS Prelaunch Technical Report Series Final Cumulative Index

*Elaine R. Firestone, General Sciences Corporation, Laurel, Maryland  
Stanford B. Hooker, NASA Goddard Space Flight Center, Greenbelt, Maryland*

National Aeronautics and  
Space Administration

**Goddard Space Flight Center**  
Greenbelt, Maryland 20771

**Available from:**

**NASA Center for AeroSpace Information**  
**7121 Standard Drive**  
**Hanover, MD 21076-1320**  
**Price Code: A17**

**National Technical Information Service**  
**5285 Port Royal Road**  
**Springfield, VA 22161**  
**Price Code: A10**

## PREFACE

The SeaWiFS Project was officially established at Goddard Space Flight Center (GSFC) on March 29, 1991 with the award of an Ocean Color Data Mission contract to Orbital Sciences Corporation (OSC). It was originated as a cooperative effort between the government and industry, and had a spacecraft launch date of 31 July 1993. In this case, GSFC and OSC would share the costs of the mission. GSFC would specify the data that was needed and buy the research rights to these data, maintaining insight, but not oversight rights, with their industrial partner. GSFC would also provide calibration and validation for these data. OSC would provide the spacecraft and instrument, launch services, and spacecraft operations to provide data for five years at a fixed price of \$43 million. OSC would retain the operational and commercial rights to these data. In order to protect OSC's data rights, research data release would be delayed, unless timely release is necessary for calibration and validation activities.

Because of the focus on data products, the Project structure is different from classic flight projects at GSFC. It is housed within the Earth science organization, where the majority of the staff are scientists. The majority of the engineering support is matrixed into the organization on an as-needed basis. During the development and early operations phase, the Project was under team leadership by the Project Manager (an engineer), and the Project Scientist (an oceanographer). After the spacecraft was launched and it entered routine operations, the Project management was turned over to the Project Scientist. Data collection is specified by the Mission Operations Element, who control the SeaWiFS instrument on the spacecraft. The global data are received at Wallops Flight Facility and are then transferred to GSFC. At GSFC, the Data Processing Element receives these data and generates standard global ocean color data products. This process includes calibration and validation of these data and quality assurance, which is provided by the Calibration and Validation Element, which also includes a Field Program for *in situ* work. Local area coverage data and back-up global data are also collected at GSFC. The Project Office Staff provide support and a buffer for the technical staff. The Project Office is virtually located on the World Wide Web, and that has made coordination of a global project infinitely easier.

The original schedule specified certified data delivery by December 1, 1993. During spacecraft development, numerous delays were encountered, and data delivery was delayed until December 20, 1997. The delay was extremely painful for everyone involved, but it did allow for significant refinement and documentation of our work. This prelaunch technical memorandum series will conclude with this 43rd volume, considerably larger than was originally anticipated. The excellence of the series was recognized by a NASA Group Achievement Award presented to the Series Editors, Stanford B. Hooker and Elaine R. Firestone. Although the instrument was optimized for ocean imaging, the SeaWiFS instrument was modified to decrease stray light effects. That change allowed the instrument to produce good land imagery as well. With the addition of the land data, the Project that was tasked with providing regular global ocean color data, was able to produce regular global biospheric data for the first time in history.

The Project thanks everyone who invested their time and energy in this effort. The research facilitated by these data will hopefully exceed all expectations—those same expectations that kept everyone going through the development phase.

"With that said, I will now turn the SeaWiFS Project over to the Project Scientist, Chuck McClain. It has been a pleasure and an inspiration to work with all of you."

Greenbelt, Maryland  
February 1998

— M. L. Cleave  
Project Manager



## ABSTRACT

The Sea-viewing Wide Field-of-view Sensor (SeaWiFS) is the follow-on ocean color instrument to the Coastal Zone Color Scanner (CZCS), which ceased operations in 1986, after an eight-year mission. SeaWiFS was launched on 1 August 1997, on the OrbView-2 satellite, built by Orbital Sciences Corporation (OSC). The SeaWiFS Project at the National Aeronautics and Space Administration (NASA) Goddard Space Flight Center (GSFC), undertook the responsibility of documenting all aspects of this mission, which is critical to the ocean color and marine science communities. This documentation, entitled the *SeaWiFS Technical Report Series*, is in the form of NASA Technical Memorandum Number 104566 and 1998-104566. All reports published are volumes within the series. This particular volume, which is the last of the so-called Prelaunch Series serves as a reference, or guidebook, to the previous 42 volumes and consists of 6 sections including: an addenda, an errata, an index to key words and phrases, lists of acronyms and symbols used, and a list of all references cited. The editors have published a cumulative index of this type after every five volumes. Each index covers the reference topics published in all previous editions, that is, each new index includes all of the information contained in the preceding indexes with the exception of any addenda.

## 1. INTRODUCTION

This is the seventh, and final volume, in a series of indexes, published as a separate volume in the Sea-viewing Wide Field-of-view Sensor (SeaWiFS) Technical Report Series, and includes information found in the first 42 volumes of the series. The Report Series was written under the National Aeronautics and Space Administration's (NASA) Technical Memorandum (TM) Number 104566 and 1998-104566. The volume numbers, authors, and titles of the volumes covered in this index are:

- Vol. 1: Hooker, S.B., W.E. Esaias, G.C. Feldman, W.W. Gregg, and C.R. McClain, *An Overview of SeaWiFS and Ocean Color*.
- Vol. 2: Gregg, W.W., *Analysis of Orbit Selection for SeaWiFS: Ascending vs. Descending Node*.
- Vol. 3: McClain, C.R., W.E. Esaias, W. Barnes, B. Guenther, D. Endres, S.B. Hooker, B.G. Mitchell, and R. Barnes, *SeaWiFS Calibration and Validation Plan*.
- Vol. 4: McClain, C.R., E. Yeh, and G. Fu, *An Analysis of GAC Sampling Algorithms: A Case Study*.
- Vol. 5: Mueller, J.L., and R.W. Austin, *Ocean Optics Protocols for SeaWiFS Validation*.
- Vol. 6: Firestone, E.R., and S.B. Hooker, *SeaWiFS Technical Report Series Cumulative Index: Volumes 1-5*.
- Vol. 7: Darzi, M., *Cloud Screening for Polar Orbiting Visible and IR Satellite Sensors*.
- Vol. 8: Hooker, S.B., W.E. Esaias, and L.A. Rexrode, *Proceedings of the First SeaWiFS Science Team Meeting*.

- Vol. 9: Gregg, W.W., F. Chen, A. Mezaache, J. Chen, and J. Whiting, *The Simulated SeaWiFS Data Set*.
- Vol. 10: Woodward, R.H., R.A. Barnes, W.E. Esaias, W.L. Barnes, A.T. Mecherikunnel, *Modeling of the SeaWiFS Solar and Lunar Observations*.
- Vol. 11: Patt, F.S., C.M. Hoisington, W.W. Gregg, and P.L. Coronado, *Analysis of Selected Orbit Propagation Models*.
- Vol. 12: Firestone, E.R., and S.B. Hooker, *SeaWiFS Technical Report Series Cumulative Index: Volumes 1-11*.
- Vol. 13: McClain, C.R., J.C. Comiso, R.S. Fraser, J.K. Firestone, B.D. Schieber, E-n. Yeh, K.R. Arrigo, and C.W. Sullivan, *Case Studies for SeaWiFS Calibration and Validation, Part 1*.
- Vol. 14: Mueller, J.L., *The First SeaWiFS Intercalibration Round-Robin Experiment, SIRREX-1, July 1992*.
- Vol. 15: Gregg, W.W., F.S. Patt, and R.H. Woodward, *The Simulated SeaWiFS Data Set, Version 2*.
- Vol. 16: Mueller, J.L., B.C. Johnson, C.L. Cromer, J.W. Cooper, J.T. McLean, S.B. Hooker, and T.L. Westphal, *The Second SeaWiFS Intercalibration Round-Robin Experiment, SIRREX-2, June 1993*.
- Vol. 17: Abbott, M.R., O.B. Brown, H.R. Gordon, K.L. Carder, R.E. Evans, F.E. Müller-Karger, and W.E. Esaias, *Ocean Color in the 21st Century: A Strategy for a 20-Year Time Series*.

SeaWiFS Prelaunch Technical Report Series Final Cumulative Index

- Vol. 18: Firestone, E.R., and S.B. Hooker, *SeaWiFS Technical Report Series Summary Index: Volumes 1-17*.
- Vol. 19: McClain, C.R., R.S. Fraser, J.T. McLean, M. Darzi, J.K. Firestone, F.S. Patt, B.D. Schieber, R.H. Woodward, E-n. Yeh, S. Mattoo, S.F. Biggar, P.N. Slater, K.J. Thome, A.W. Holmes, R.A. Barnes, and K.J. Voss, *Case Studies for SeaWiFS Calibration and Validation, Part 2*.
- Vol. 20: Hooker, S.B., C.R. McClain, J.K. Firestone, T.L. Westphal, E-n. Yeh, and Y. Ge, *The SeaWiFS Bio-Optical Archive and Storage System (SeaBASS), Part 1*.
- Vol. 21: Acker, J.G., *The Heritage of SeaWiFS: A Retrospective on the CZCS NIMBUS Experiment Team (NET) Program*.
- Vol. 22: Barnes, R.A., W.L. Barnes, W.E. Esaias, and C.R. McClain, *Prelaunch Acceptance Report for the SeaWiFS Radiometer*.
- Vol. 23: Barnes, R.A., A.W. Holmes, W.L. Barnes, W.E. Esaias, C.R. McClain, and T. Svitek, *SeaWiFS Prelaunch Radiometric Calibration and Spectral Characterization*.
- Vol. 24: Firestone, E.R., and S.B. Hooker, *SeaWiFS Technical Report Series Summary Index: Volumes 1-23*.
- Vol. 25: Mueller, J.L., and R.W. Austin, *Ocean Optics Protocols for SeaWiFS Validation, Revision 1*.
- Vol. 26: Siegel, D.A., M.C. O'Brien, J.C. Sorensen, D.A. Konnoff, E.A. Brody, J.L. Mueller, C.O. Davis, W.J. Rhea, and S.B. Hooker, *Results of the SeaWiFS Data Analysis Round-Robin (DARR-94), July 1994*.
- Vol. 27: Mueller, J.L., R.S. Fraser, S.F. Biggar, K.J. Thome, P.N. Slater, A.W. Holmes, R.A. Barnes, C.T. Weir, D.A. Siegel, D.W. Menzies, A.F. Michaels, and G. Podesta, *Case Studies for SeaWiFS Calibration and Validation, Part 3*.
- Vol. 28: McClain, C.R., K.R. Arrigo, W.E. Esaias, M. Darzi, F.S. Patt, R.H. Evans, J.W. Brown, C.W. Brown, R.A. Barnes, and L. Kumar, *SeaWiFS Algorithms, Part 1*.
- Vol. 29: Aiken, J., G.F. Moore, C.C. Trees, S.B. Hooker, and D.K. Clark, *The SeaWiFS CZCS-Type Pigment Algorithm*.
- Vol. 30: Firestone, E.R., and S.B. Hooker, *SeaWiFS Technical Report Series Summary Index: Volumes 1-29*.
- Vol. 31: Barnes, R.A., A.W. Holmes, and W.E. Esaias, *Stray Light in the SeaWiFS Radiometer*.
- Vol. 32: Campbell, J.W., J.M. Blaisdell, and M. Darzi, *Level-3 SeaWiFS Data Products: Spatial and Temporal Binning Algorithms*.
- Vol. 33: Moore, G.F., and S.B. Hooker, *Proceedings of the First SeaWiFS Exploitation Initiative (SEI) Team Meeting*.
- Vol. 34: Mueller, J.L., B.C. Johnson, C.L. Cromer, S.B. Hooker, J.T. McLean, and S.F. Biggar, *The Third SeaWiFS Intercalibration Round-Robin Experiment (SIRREX-3), 19-30 September 1994*.
- Vol. 35: Robins, D.B., A.J. Bale, G.F. Moore, N.W. Rees, S.B. Hooker, C.P. Gallienne, A.G. Westbrook, E. Marañón, W.H. Spooner, and S.R. Laney, *AMT-1 Cruise Report and Preliminary Results*.
- Vol. 36: Firestone, E.R., and S.B. Hooker, 1996: *SeaWiFS Technical Report Series Cumulative Index: Volumes 1-35*.
- Vol. 37: Johnson, B.C., S.S. Bruce, E.A. Early, J.M. Houston, T.R. O'Brian, A. Thompson, S.B. Hooker, and J.L. Mueller, 1996: *The Fourth SeaWiFS Intercalibration Round-Robin Experiment (SIRREX-4), May 1995*.
- Vol. 38: McClain, C.R., M. Darzi, R.A. Barnes, R.E. Eplee, J.K. Firestone, F.S. Patt, W.D. Robinson, B.D. Schieber, R.H. Woodward, and E-n. Yeh, 1996: *SeaWiFS Calibration and Validation Quality Control Procedures*.
- Vol. 39: Barnes, R.A., E-n. Yeh, and R.E. Eplee, 1996: *SeaWiFS Calibration Topics, Part 1*.
- Vol. 40: Barnes, R.A., R.E. Eplee, Jr., E-n. Yeh, and W.E. Esaias, 1997: *SeaWiFS Calibration Topics, Part 2*.
- Vol. 41: Yeh, E-n., R.A. Barnes, M. Darzi, L. Kumar, E.A. Early, B.C. Johnson, and J.L. Mueller, 1997: *Case Studies for SeaWiFS Calibration and Validation, Part 4*.
- Vol. 42: Falkowski, P.G., M.J. Behrenfeld, W.E. Esaias, W. Balch, J.W. Campbell, R.L. Iverson, D.A. Kiefer, A. Morel, and J.A. Yoder, 1998: *Satellite Primary Productivity Data and Algorithm Development: A Science Plan for Mission to Planet Earth*.
- Vol. 43: Firestone, E.R., and S.B. Hooker, 1998: *SeaWiFS Prelaunch Technical Report Series Final Cumulative Index*.

This final volume serves as a reference, or guidebook, to the entire Prelaunch Series. It consists of the four main sections included with the all of the indexes published: a cumulative index to key words and phrases, a glossary of acronyms, a list of symbols used, and a bibliography of all references cited in the series. In addition, as in some

of the other index volumes, an errata section has been added to address issues and needed corrections which have come to the editors' attention since the volumes were first published. Also, an addenda section has been added to include the proceedings of various workshops, which are too short in length to warrant a separate volume within the series.

The nomenclature of the index is a familiar one, in the sense that it is a sequence of alphabetical entries, but it utilizes a unique format since multiple volumes are involved. Unless indicated otherwise, the index entries refer to some aspect of the SeaWiFS instrument or project, for example, the *mission overview* index entry refers to an overview of the SeaWiFS mission. An index entry is composed of a keyword or phrase followed by an entry field that directs the reader to the possible locations where a discussion of the keyword can be found. The entry field is normally made up of a volume identifier shown in bold face, followed by a page identifier, which is always enclosed in parentheses:

keyword, **volume**(pages).

If an entry is the subject of an entire volume, the volume field is shown in slanted type without a page field:

keyword, **Vol.** #.

An entry can also be the subject of a complete chapter. In this instance, both the volume number and chapter number appear without a page field:

keyword, **volume(ch. #)**.

Figures or tables that provide particularly important summary information are also indicated as separate entries in the page field (even if they fall within an already specified page range). In this case, the figure or table number is given with the page number on which it appears.

keyword, **volume(Fig. # p. #)**.

or

keyword, **volume(Table # p. #)**.

## 2. ERRATA

Note: Since the issuance of previous volumes, a number of the references cited have changed their publication status, e.g., they have gone from "submitted" or "in press" to printed matter. In other instances, some part (or parts) of the citation, e.g., the title or year of publication, has changed or was printed incorrectly. Listed below are the references in question as they were cited in one or more of the first 42 volumes in the series, along with how they now appear in the references section of this volume.

### Original Citation

Behrenfeld, M.J., and P.G. Falkowski, 1997: A consumers guide to primary productivity models. *Limnol. Oceanogr.*, (submitted).

### Revised Citation

Behrenfeld, M.J., and P.G. Falkowski, 1997: A consumers guide to primary productivity models. *Limnol. Oceanogr.*, **42**, 1,479–1,491.

### Original Citation

Bidigare, R.R., L. Campbell, M.E. Ondrusek, R. Letelier, D. Vaulot and D.M. Karl, 1995: Phytoplankton community structure at station ALOHA ( $22^{\circ} 45' N$ ,  $158^{\circ} W$ ) during fall 1991. *Deep-Sea Res.*, (submitted).

### Revised Citation

Andersen, R.A., R.R. Bidigare, M.D. Keller, and M. Latasa, 1996: A comparison of HPLC pigment signatures and electron microscopic observations for oligotrophic waters of the North Atlantic and Pacific Oceans. *Deep-Sea Res.*, **43**, 517–537.

### Original Citation

Carder, K.L., S.K. Hawes, and Z. Lee, 1996: SeaWiFS algorithm for chlorophyll *a* and colored dissolved organic matter in subtropical environments. *J. Geophys. Res.*, (submitted).

### Revised Citation

Carder, K.L., S.K. Hawes, Z. Lee, and F.R. Chen 1997: *MODIS Ocean Science Team Algorithm Theoretical Basis Document Case 2 chlorophyll a*. ATBD-Mod. 19, Version 4, 15 August 1997 [World Wide Web page.] From URL: <http://ltpwww.gsfc.nasa.gov/MODIS/MODIS.html> NASA Goddard Space Flight Center, Greenbelt, Maryland.

### Original Citation

Early, E.A., and B.C. Johnson, 1996: Calibration and Characterization of the Goddard Space Flight Center Sphere. *NASA Tech. Memo. 104566*, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, (accepted).

### Revised Citation

Early, E.A., and B.C. Johnson, 1997: "Calibration and Characterization of the GSFC Sphere." In: E-n. Yeh, R.A. Barnes, M. Darzi, L. Kumar, E.A. Early, B. Carol Johnson, J.L. Mueller, and C.C. Trees, 1997: Case Studies for SeaWiFS Calibration and Validation, Part 4 *NASA Tech. Memo. 104566*, Vol. 41, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 3–17.

### Original Citation

Johnson, B.C., C.L. Cromer, and J.B. Fowler, 1996: The SeaWiFS Transfer Radiometer (SXR). *NASA Tech. Memo. 104566*, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, (accepted).

*Revised Citation*

Johnson, B.C., C.L. Cromer, and J.B. Fowler, 1998: The SeaWiFS Transfer Radiometer (SXR). *SeaWiFS PostLaunch Technical Report Series*, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, (accepted).

*Original Citation*

Proctor, J., and Y.P. Barnes, 1996: NIST High Accuracy Reference Reflectometer-spectrophotometer. *J. Res. Natl. Inst. Stand. Technol.*, **101**, (accepted).

*Revised Citation*

Proctor, J., and Y.P. Barnes, 1996: NIST High Accuracy Reference Reflectometer-spectrophotometer. *J. Res. Natl. Inst. Stand. Technol.*, **101**, 619–627.

*Original Citation*

Soffer, R.J., J.W. Harron, and J.R. Miller, 1995: Characterization of Kodak grey cards as reflectance reference panels in support of BOREAS field activities. *Proc. Canadian Remote Sens. Symp.*, (submitted).

*Revised Citation*

Soffer, R.J., J.W. Harron and J.R. Miller, 1995: Characterization of Kodak grey cards as reflectance reference panels in support of BOREAS field activities. *Proc. 17th Canadian Symp. Remote Sens.*, Saskatoon, Saskatchewan, Canadian Remote Sensing Society, Canadian Aeronautics and Space Institute, Ottawa, Ontario, 357–362.

### 3. ADDENDA

This section presents a summary of the SeaWiFS Bio-optical Algorithm Mini-workshop (SeaBAM) which was held 21–24 January 1997; submitted by C. McClain. In addition, it presents a summary of the proceedings from the Second SeaWiFS Science Team Meeting held at the Omni Hotel in Baltimore, Maryland, 6–8 January 1998.

#### 3.1 SeaBAM Abstract

One of the primary goals of the SeaWiFS Project is to routinely generate global chlorophyll *a* and Coastal Zone Color Scanner (CZCS) pigment concentrations with an accuracy of  $\pm 35\%$  (Hooker et al. 1992). Since its inception in 1991, the SeaWiFS Calibration and Validation Program has undertaken a number of initiatives to help ensure that this goal is met, e.g., measurement protocol development, calibration round-robbins, a bio-optical data archive, and bio-optical algorithm workshops. After the seventh bio-optical algorithm workshop held in Halifax, Nova Scotia on 21 October 1996, it was clear that algorithm and data quality issues remained that could not be adequately addressed in the standard workshop format. A more interactive analysis (data sets and algorithms) workshop was

deemed necessary in order to focus on specific problems. As a result, the first SeaWiFS Bio-optical Algorithm Mini-workshop (SeaBAM) was hosted by D. Siegel at the University of California at Santa Barbara (UCSB) during 21–24 January 1997. This chapter provides an overview of the workshop background, organization, approach, and results from the workshop and other associated activities.

#### 3.1.1 Introduction

The rationale behind the CZCS pigment product (chlorophyll *a* plus phaeophytin) is to provide a data set that can be compared to products derived from CZCS for studies of decadal scale variability. Early comparisons of *in situ* and CZCS global products (Balch et al. 1992) indicated that this goal was feasible for most of the global ocean. Subsequent studies, however, noted significant differences even in clear water environments (Arrigo et al. 1994). The CZCS algorithm was based on 55 bio-optical stations in coastal US waters (Clark 1981; usually referred to as the Nimbus Experiment Team, or NET, data set) and even by 1991, that data set was the only data set generally available for algorithm development. As a result, the SeaWiFS Calibration and Validation Program initiated several activities directed at improving the quality of bio-optical data collected by the ocean optics community. These activities included the establishment of measurement protocols (Mueller and Austin 1992 and 1995), the SeaWiFS Intercalibration Round-Robin Experiments (SIRREXs, e.g., Johnson et al. 1996), the SeaWiFS Bio-optical Archive and Storage System (SeaBASS; Hooker et al. 1994), the SeaWiFS Transfer Radiometer (SXR) and the SeaWiFS Quality Monitor (SQM, Shaw et al. 1996, Hooker and Aiken 1998, and Johnson et al. 1998). In addition, seven bio-optical algorithm workshops have been held, brief proceedings of which are published in the *SeaWiFS Technical Report Series* cumulative indexes Volumes 12, 18, 24, and 36 (Firestone and Hooker 1993, 1994, 1995, and 1996).

The bio-optical algorithm workshops have been open events and have provided a forum for presentation and detailed discussions on protocols, data collection, and algorithm issues. Early in the deliberations on algorithm development, it was decided to avoid switching algorithms, such as was used in the global CZCS reprocessing (Gordon et al. 1983) and to use a semi-analytical chlorophyll algorithm. Switching algorithms tend to produce bimodal frequency distributions as an artifact of the switching logic (Denman and Abbott 1988 and Müller-Karger et al. 1990). Semi-analytical algorithms (Carder et al. 1991, Garver and Siegel 1997, and Carder et al. 1997) would allow more physical insight into the optical processes that determine oceanic reflectance, thus providing a mechanism for incorporating strategies to account for regional and temporal variability in the algorithm.

The discussions at the workshops were very constructive in highlighting the differences in perceptions and approaches to algorithm development. The CZCS pigment product, for example, raised several questions. Should the algorithm be chlorophyll *a*, or chlorophyll *a* plus phaeophytin [as it was just as easy to develop an empirical algorithm for chlorophyll *a* (Aiken et al. 1995)]. If just chlorophyll *a*, why is a CZCS pigment product needed? Should the CZCS pigment product be based only on CZCS bands (SeaWiFS equivalents), and should it be derived using a CZCS atmospheric correction? The issue is that if the CZCS atmospheric correction scheme (uses 670 nm) and bio-optical band limitations (443, 520, and 550 nm) introduce a systematic bias in the pigment product that is not reproduced in subsequent ocean color data sets, the interpretation of decadal-scale change will be compromised. Another question is what measurements of pigments should be used in defining the CZCS pigment product given the evolution in measurement techniques [fluorometric, high performance liquid chromatography (HPLC), etc.], and is consistency with the original NET CZCS data set necessary? In the end, the general consensus, though not unanimous, was to continue using the original product definition, but to use the best algorithms possible, i.e., the SeaWiFS atmospheric correction and no restriction on the bands to be used for the bio-optical algorithms.

With regard to the bio-optics subgroup's recommendation to pursue semi-analytical algorithms for operational use, it has become clear that the existing semi-analytical algorithms are limited to Case-1, relatively low pigment waters. The main issues are a paucity of data on scattering and the variability in spectral absorption. While new methods and instrumentation for measuring the backscattering coefficient hold promise, little is currently available. Also, the measurement of spectral absorption, let alone a way of parameterizing its variability, remains an issue. In response to this problem, the SeaWiFS Calibration and Validation Program funded a workshop at the Scripps Institute of Oceanography, hosted by G. Mitchell and A. Bricaud in December 1996, to compare and evaluate different methods. The results of the workshop are not available as yet; thus, at the present time, the semi-analytical algorithms are inherently empirical, at a different level, and some resort to strictly empirical relationships at high concentrations (Carder et al. 1997). The limitations, at the present time, reside in the determination of the various absorption and backscattering coefficients, i.e., measurement methodologies, parameterizations, etc. Despite these limitations, semi-analytical algorithms do generate reasonable chlorophyll *a* values for most of the global ocean as well as a number of other quantities that could be routinely produced by the SeaWiFS Project, if required by the science community. Also, they can be easily adapted to any combination of wavelengths commensurate with any satellite sensor. Therefore, whether or not the initial SeaWiFS algorithms are semi-analytical, their development should

continue because the original rationale remains valid and justified.

Finally, another issue which complicates the algorithm evaluation process stems from differences in reflectance measurement methodologies, i.e., above- versus below surface. Both methods have limitations. Above-surface measurements are contaminated by skylight, glint, polarization, and plaque bidirectional reflectance effects. Below-surface measurements require absolute radiance calibrations, an extrapolation through the air-sea interface, and a correction for instrument self-shading in turbid water. The Carder et al. (1997) algorithm uses above-surface measurements, but the bulk of the data available for independent algorithm verification are below-surface observations. No systematic comparison of the two methods has been conducted; the protocol for making above-surface reflectance measurements (Mueller and Austin 1995) is considered by many to be inadequate. The SeaWiFS Project sponsored a workshop on Case-2 measurement protocols in the spring of 1996 (Firestone and Hooker 1996) with the objective of refining the existing protocols, but the workshop coordinators have not completed the document that was outlined at the meeting. The Sensor Intercomparison and Merger for Biological and Interdisciplinary Studies (SIMBIOS) Project plans to sponsor focused field experiments designed to clarify, and hopefully, resolve this issue.

After the seventh bio-optical algorithm meeting in October 1996, it was clear that convergence on the operational algorithms was not happening in a satisfactory manner. Indeed, the primary candidate algorithms for chlorophyll *a* (Carder et al. 1997) and CZCS pigment (Aiken et al. 1995) were seriously inconsistent at moderate and high concentrations, i.e., chlorophyll *a*  $\gg$  CZCS pigment. It is with all the above-mentioned considerations in mind that SeaBAM was initiated. The consensus was that further progress would result only if the participants work collectively with open access to data and codes (data processing and algorithm codes) in a similar fashion to the data analysis round-robin held at UCSB in 1994 (Siegel et al. 1995c). The following sections outline the workshop strategy including pre- and post-workshop activities and a summary of the findings derived as a result of the SeaBAM process. It is the philosophy of the SeaWiFS Project not to develop the operational algorithms, but to expedite algorithm development via whatever mechanisms are possible and to provide an independent and objective evaluation. From the SeaWiFS Project's perspective, SeaBAM has achieved more than was initially hoped for because of the enthusiasm and openness of all the participants. Data and software were freely exchanged, errors were revealed and corrected (without angst), and substantial improvements in almost all the evaluated algorithms were made. Last, but not least, a consistent set of chlorophyll *a* and CZCS pigment algorithms were identified using a large bio-optical data set representing a diversity of bio-optical provinces.

**Table 1.** Participants in SeaBAM held 21–24 January 1997 at UCSB in Santa Barbara, California.

Participants	Affiliation
K. Carder	Univ. of South Florida
S. Garver†	Univ. of California, Santa Barbara
S. Hawes	Univ. of South Florida
M. Kahru	Scripps Institution of Oceanography
S. Maritorena	SeaWiFS Project, NASA/GSFC
C. McClain	SeaWiFS Project, NASA/GSFC
G. Mitchell	Scripps Institution of Oceanography
G. Moore	Plymouth Marine Laboratory
J. Mueller	San Diego State University
J. O'Reilly	NOAA/National Marine Fisheries Service
D. Siegel	Univ. of California, Santa Barbara
B. Schieber	SeaWiFS Project, NASA/GSFC

† S. Garver is now affiliated with California State Polytechnic University, Pomona, California.

### 3.1.3 Objectives and Approach

Given that the primary objective was to finalize and deliver the operational SeaWiFS chlorophyll *a* and CZCS pigment algorithms in a relatively short time, it was agreed by the participants (Table 1) that a successful workshop would require a substantial amount of pre-workshop preparation, and the free and rapid dissemination of data, code, and results. It also required that all those involved be willing to assist one another, work out problems and differences of opinion internally, and to recognize that all options were open with regard to the final algorithm selections. The strategy was to have a balanced, but small, group of participants, including representatives from the SeaWiFS Project and others who had been active in the bio-optics subgroup as algorithm developers (empirical and semi-analytic), and bio-optical data providers. It was also agreed that D. Siegel would host the workshop at UCSB and that he would assume responsibility for providing a workshop environment that efficiently accommodated both group discussion and presentation sessions and a heterogeneous computing and data storage environment. GSFC would coordinate pre- and post-workshop activities including maintenance of an access-restricted SeaBAM web page where data, results, and electronic mail (e-mail) would be posted and archived. Both S. Maritorena (GSFC) and S. Garver (UCSB) had been developing data sets of water-leaving radiances (and other related quantities) with associated pigment data for the purposes of independent evaluation and algorithm development, respectively (Garver and Siegel 1997 and O'Reilly et al. 1998). They would continue the refinement and expansion of these data sets, coordinate their activities, e.g., exchange data, in preparation for the mini-workshop, and provide the data sets to the other participants. The initial version of the O'Reilly et al. data set, which was presented at the Halifax workshop, consisted of approximately 90–100 clear-sky stations. It was agreed that this condition was too restrictive and

that other data should be incorporated. Finally, it was agreed that all groups would provide documentation on their evaluations, and results would be combined into a SeaWiFS technical memorandum.

To establish a framework for SeaBAM, an initial set of issues, tasks and goals were outlined, which included the following:

- 1) Settle on the definition of "CZCS pigments." This question is the result of the differences in measurement methodologies.
- 2) Establish a clear definition of accuracy and identify the appropriate statistical parameter(s) for quantification of accuracy as it applies to algorithms.
- 3) Establish criteria for final selection of the "best" algorithm for both pigment parameters.
- 4) Identify the algorithms to be compared and identify probable reasons for differences. Ultimately, the algorithms included the following:
  - a) Aiken et al. (1995);
  - b) Carder et al. (1997);
  - c) Clark (1997);
  - d) Garver and Siegel (1997);
  - e) Mitchell and Kahru (California Cooperative Fisheries Institute [CalCOFI], unpublished);
  - f) Morel (1996);
  - g) New empirical (e.g., one based on the evaluation data set);
  - h) Gordon et al. (1983);
  - i) Ocean Color and Temperature Scanner (OCTS) operational chlorophyll *a*; and
  - j) Polarization and Directionality of the Earth's Reflectance (POLDER) operational algorithm.
- 5) Establish data set selection guidelines. Considerations included:
  - a) Blending of HPLC pigments with fluorometric pigments;

- b) SeaWiFS measurement protocols compliance;
  - c) Blending of in-water and above-water estimates of  $R_{rs}$  or  $L_{WN}$ ; and
  - d) Consistency in analyses used to derive  $L_W$  from in-water measurements.
- 6) Select the data sets to be used for the comparisons. The individual data sets were:
- a) Carder et al. (above-water observations);
  - b) Garver and Siegel (in-water observations);
  - c) O'Reilly et al. evaluation data set (in-water observations); and
  - d) Mitchell and Kahru (CalCOFI, in-water observations)

All issues were eventually addressed.

### 3.1.4 The UCSB Meeting

Prior to the workshop, a global evaluation data set was assembled by combining a number of data sets contributed, primarily, by the participants. J. O'Reilly and S. Maritorena used this data set to complete an initial comparison of all algorithms prior to the meeting. The first day of the meeting consisted of briefings by all of the groups to provide updates on all preparations and results stemming from pre-workshop activities. During the presentations, an issues and analysis action item list was developed and reviewed at the end of the session. Thereafter, the groups conducted hands-on analyses to address the action items and periodically reconvened to report their progress and register any additional issues that needed to be tracked. On the last day, a plenary session was held to review the final status of all action items and to outline the post-workshop activities and schedule. To provide some insight into what the action items were and how they were resolved, several are described in Section 3.1.6.

### 3.1.5 Final Results and Conclusions

As discussed above, all the original issues were addressed, as well as a number of others that developed during SeaBAM. Conducting algorithm development in this fashion greatly expedited resolution of many questions. Most of the algorithms and the evaluation data set were improved as a result of SeaBAM. The most important results are the final recommendations on the operational SeaWiFS algorithms which are summarized below.

1. *Chlorophyll a*: Because the evaluation data set has the most bio-optical diversity of the data sets listed above, and was quality controlled and processed in a consistent manner (O'Reilly et al. 1998), it was used to obtain the "best" algorithm possible. Therefore, it evolved from being an independent data set to one used to develop empirical algorithms as well. Not only were all final versions of the algorithms as submitted by the developers considered, but

also, for the empirical algorithms, these and other algorithmic forms (band ratio combinations) were fit to the evaluation data to see what improvements were possible. The algorithm that gave the best overall result, based on the selection criteria outlined in O'Reilly et al. (1998), uses only a ratio of 490 nm to 555 nm, i.e.,

$$C = -0.040 + 10^{(0.341-3.001X+2.811X^2-2.041X^3)}, \quad (1)$$

where  $C$  is defined as chlorophyll *a* pigment concentration, and where

$$X = \log_{10} \frac{R_{rs}(490)}{R_{rs}(555)}. \quad (2)$$

This result is consistent with the Aiken et al. (1995) finding that a 490:555 band ratio yielded the highest correlation ( $R^2 = 0.95$ ) for the data sets in their analysis.

2. *CZCS pigment*: As discussed in O'Reilly et al. (1998), there are a number of options for this product, not all of which follow the original guideline of using an algorithm that uses only the CZCS bands. Clearly, there should be reasonable consistency between the two pigment products. Also, an evaluation data set for CZCS, comparable to the one just completed for SeaWiFS, needs to be generated. For the at-launch algorithm, the recommendation is the following relationship which is based on a empirical relationship of chlorophyll *a*, and chlorophyll *a* plus phaeophytin, concentrations derived from the SeaBASS pigment database, i.e.,

$$\text{CZCS}_{\text{pigment}} = 1.34 C^{0.98}. \quad (3)$$

It is important to note that the SeaWiFS Project plans to periodically reprocess the entire SeaWiFS data set as algorithms (atmospheric, bio-optical, mask, and flag), sensor calibration, and product suites are updated. Thus, it is critical that the SeaBAM activity be continued.

### 3.1.6 Workshop Action Items

In order to emphasize the benefits of conducting workshops that are oriented around data analysis and real-time algorithm evaluation, the following list of results stemming from action items are provided below. This meeting format expedited, even forced, the resolution of questions and issues, usually at the meeting. In the typical meeting format, questions often go unresolved resulting in continued debate and misunderstanding.

*Action Item:* 1. State succinctly the practical definitions of CZCS pigments and chlorophyll *a* with rationale for the choices.

*Definition of CZCS pigment:* A fluorometric pigment concentration (chlorophyll *a* plus phaeopigments) that can be calculated using bands comparable to the CZCS wavelengths (443, 520, and 550). Note that the SeaWiFS protocols need to be more detailed on this topic. The purpose

of generating this product is to provide a means of comparing products that can be derived from CZCS to those from later missions for examining decadal scale variability. Restricting the algorithm to the CZCS wavelengths minimizes biases introduced in the products that are artifacts of the algorithm form. It is assumed that the global CZCS data set will be reprocessed using an updated pigment algorithm that is consistent with the SeaWiFS pigment algorithm. S. Maritorena will evaluate the assumption that the differences between fluorometric and HPLC bio-optical data sets are indistinguishable using the evaluation data set.

The issue of how to validate the reprocessed CZCS products using simultaneous measurements was discussed. Given that algorithms being developed at this time are based on different pigment measurement methodologies which yield different values, validation using historical data will require some adjustment in the historical values.

**Status:** Post-workshop examination of the SeaBASS data sets showed that there are a very limited number of stations available having the CZCS bands and chlorophyll *a* plus phaeophytin concentrations on which to base a global algorithm (O'Reilly et al. 1998) and alternative strategies are outlined in O'Reilly et al. (1998).

**Definition of Chlorophyll *a*:** Any fluorometric or HPLC concentration identified as chlorophyll *a* by the provider. While there are differences in the values obtained by the two techniques, globally the difference has been shown to be of the order of 10% (analysis by C. Trees). Also, at least for the time being, both HPLC and fluorometric data have been combined in order to have a data set sufficiently large, with enough diversity, to cover the broad range of chlorophyll concentrations required for development of a general chlorophyll algorithm. Debate continues as to what pigments should be, or are being, summed and reported as "chlorophyll" concentration in the data sets being submitted to SeaBASS.

**Status:** Because other sources of variability in the bio-optical data sets (e.g., data processing methods and calibration) have been found to be as great, and in order to have enough data over a large dynamic range to develop and evaluate algorithms, this definition was adopted.

**Action Item 2.** Reconcile the differences in the  $L_w$  spectral shapes of CalCOFI-2, as obtained independently by S. Garver and M. Kahru. The problem is an elevated shoulder at 490 nm relative to 443 nm in the Kahru analysis.

**Status:** The anomalous spectral shoulder was found to be a typographical error in a table used in the transformation of subsurface  $L_u(443)$  to the above-surface  $L_w(443)$ .

**Action Item 3.** Resolve a problem S. Garver and D. Siegel observed with some of C. Trees' North Atlantic Bloom Experiment (NABE) optical data.

**Status:** J. Mueller checked the scaling factor Garver and Siegel were using and the problem was a misinterpretation of the scaling factor format. NABE is consistent with other data sets.

**Action Item 4.** Determine the reason why the 412 nm surface reference values in G. Cota's Resolute Bay data are inconsistent with values in the profile data (a 2-4 fold difference was found in all profiles for all three cruises, each in a different year).

**Status:** G. Cota was contacted and will try to develop a time series of his calibration data. The 412 nm filters were replaced in both instruments after the 1995 field campaign. As a result, the 1994 and 1995 data were excluded from the evaluation data set, but the 1996 data were retained.

**Action Item 5.** Verify a constant offset between the evaluation data set and D. Clark's algorithm (the algorithm had the highest  $R^2$  when compared with the evaluation data set).

**Status:** J. Mueller and S. Maritorena spoke with D. Clark after the workshop. The source of the offset could not be readily identified, so further evaluation of the Clark algorithm was deferred until an update is made available.

**Action Item 6.** Examine the impact of data with 565 nm rather than 555 nm on the algorithm comparisons. The World Ocean Circulation Experiment (WOCE) and the early Bermuda Atlantic Time-Series Station (BATS) data have 565 nm measurements rather than 555 nm. Both data sets are from low pigment waters. Given the significant slope in water absorption spectrum at these wavelengths, the data should be corrected or omitted from the SeaWiFS algorithm evaluations.

**Status:** S. Maritorena analyzed several data sets and derived a correction factor for transforming 565 nm to 555 nm radiances. The corrected data were retained in the evaluation data set.

**Action Item 7.** Investigate what appears to be anomalous 412 nm data in J. Marra's WOCE data set. Some 412 nm data appears to be very high, even for very clear water.

**Status:** J. Mueller did the calibration on J. Marra's marine environmental radiometer (MER) and followed up on this question. As a result, the 1991 data was removed from the evaluation data set because of concerns about the calibration, but the data from 1993 and 1994 were retained.

### 3.2 SeaWiFS Science Team Meeting

The Second SeaWiFS Science Team Meeting was held at the Omni Hotel in Baltimore, Maryland, 6-8 January 1998. The team members and invited guests are listed in Table 2.

The objectives of the meeting were to:

- 1) Heighten the awareness of the science team as to the organization and functionality of the SeaWiFS Project,
- 2) Inform the science team of the quality and availability of the SeaWiFS data set, and
- 3) Encourage information exchange and collaboration among science team members.

The first day was dedicated to briefings by members of the SeaWiFS Project, and other related activities. The remainder of the meeting consisted of break-out sessions on a variety of topics so as to get input from the science community and to help focus on particular issues confronting the Project and the NASA Biogeochemistry Program. All investigators were invited to display posters in the foyer of the meeting complex for the entire duration of the meeting; most investigators took advantage of the opportunity.

#### A. Tuesday Morning: General Session

1. Introductory Talks
  - a. Welcome and Meeting Schedule/Objectives (C. McClain)
  - b. Meeting Logistics (G. Valenti)
  - c. NASA Biogeochemistry Program Status and HQ Perspective (J. Campbell)
  - d. Overview of science team investigations (J. Campbell)
2. Project Report
  - a. SeaWiFS Project Overview (M. Cleave)
  - b. Data Processing Overview (G. Feldman)
  - c. Calibration and Validation Program Overview (C. McClain)
  - d. Real-Time Cruise Support (A. Isaacman)

#### B. Tuesday Afternoon

1. Project Reports (continued)
  - a. Project Science (C. McClain)
  - b. Science Team Working Groups and Executive Council (C. McClain)
  - c. Report by the GSFC Distributed Active Archive Center (DAAC) (G. Leptoukh)
  - d. Discussion on SeaWiFS Data Policy (M. Cleave)
2. Reports from Other Projects
  - a. MODIS (W. Esaias)
  - b. SIMBIOS Project (C. McClain)
  - c. SeaWiFS Data Applications in Other Disciplines
    - i. Land (C.J. Tucker)
    - ii. Clouds (M. Wang)
    - iii. Smoke Index (E. Vermote)

#### C. Wednesday Morning: Working Sessions

1. General Plenary and Organization Session (C. McClain)

2. Break-out session on algorithm performance and product validation (Chair: C. McClain)
3. SeaDAS and SeaBASS updates and demonstrations (Chair: M. Darzi)
4. Break-out session of the Primary Productivity Working Group (Chair: W. Esaias)

#### D. Wednesday Afternoon

1. Break-out session on revising the archive product suite (Chair: G. Feldman)
2. SeaDAS and SeaBASS updates and demonstrations (Chair: M. Darzi)
3. Break-out session of the Executive Council (Chair: J. Campbell)

#### E. Thursday Morning

1. General session on science team coordination and organization (Chair: J. Campbell)
2. General session on OCTS and CZCS reprocessing (Chair: J. Yoder)
3. Meeting wrap-up and break-out session summaries (Chair: C. McClain)
4. Break-out session reports
  - a. Algorithm evaluation (C. McClain)
  - b. Primary Productivity (W. Esaias)
  - c. Data products (G. Feldman and M. Darzi)
  - d. CZCS and OCTS processing (J. Yoder)
  - e. Working groups and team coordination (J. Campbell and C. McClain)
  - f. Executive Council (C. McClain)

#### 3.2.1 SeaWiFS Executive Council

Because of the size of the Science Team, both NASA HQ and the SeaWiFS Project felt that a smaller group to serve as advisors to the SeaWiFS Project and the Biogeochemistry Program was needed. Specifically, the group would:

- 1) Work with the Ocean Biogeochemistry Program (OBP) Manager to represent the SeaWiFS Science Team interests within NASA and at the national and international program levels;
- 2) Preserve, promote, and wherever possible, expand mission science goals;
- 3) Foster interaction between the SeaWiFS Project and the science community;
- 4) Enhance public awareness of scientific results derived from SeaWiFS data products;
- 5) Provide timely advice on issues concerning the Project, e.g., data products;
- 6) Present science community issues and desires to the Project and the OBP;
- 7) Assist in representing the Project and the OBP at national and international meetings; and

**Table 2.** The team members of the Second SeaWiFS Science Team Meeting, held 6–8 January 1998 at the Omni Hotel in Baltimore, Maryland. Participants are identified with a checkmark (✓).

Team Members	Present	Team Members	Present	Team Members	Present	Team Members	Present
S. Ackleson	✓	P. Falkowski	✓	D. Kiefer		J. O'Reilly	✓
R. Arnone	✓	M. Fang		M. Kishino		D. Robinson	✓
K. Arrigo	✓	R. Frouin	✓	O. Kopelevich		K. Shifrin	✓
R. Barber		H. Fukushima	✓	R. Kudela	✓	D. Siegel	✓
M. Behrenfeld	✓	S. Gallegos	✓	J. Marra	✓	H. Sosik	✓
R. Bidigare	✓	C. Garcias	✓	J. Marshall		P. Stegmann	✓
J. Bisagni	✓	G. Gaxiola-Castro	✓	C. McClain	✓	A. Thomas	✓
J. Bishop	✓	R. Glazman	✓	D. McGillicuddy	✓	U. Ünlüata	
P. Bissett	✓	D. Glover	✓	A. Miller		C. Vorosmarty	✓
J. Brock	✓	J. Gower	✓	B.G. Mitchell	✓	A. Weidemann	✓
C. Brown	✓	W. Gregg	✓	B. Monger	✓	C. Yentsch	✓
J. Campbell	✓	D. Halpern	✓	A. Morel	✓	J. Yoder	✓
M-E. Carr	✓	L. Harding	✓	J. Mueller	✓	S. Yvon-Lewis	✓
P. Coble	✓	E. Hofmann	✓	F. Müller-Karger	✓	E. Zalewski	✓
G. Cota	✓	F. Hoge		R. Najjar	✓	J.R. Zaneveld	✓
A. Cracknell	✓	J. Irish	✓	J. Nelson	✓	G. Zibordi	✓
C. Davis		R. Iturriaga	✓	N. Nelson	✓		
S. Doney		P. Kamykowski		J. Nihoul			
W. Esaias	✓	L. Kantha	✓	P. Niiler (J. Moison)	✓		

- 8) Serve as liaisons to other science programs on behalf of the SeaWiFS Project and the OBP.

The initial Executive Council membership is meant to represent a cross-section of the science team with flexible tenures based on participation and interest. The members include representatives from NASA activities and the larger ocean color community (Table 3).

### 3.2.2 Working Groups

The SeaWiFS Science Team, consisting of 88 members, represents a large community with diverse scientific interests. Since the whole team will meet at most once a year (probably less frequently), most activities within the team will need to be carried out by smaller working groups.

A number of focus areas were identified that had sufficient interest to warrant the formation of a working group, and a leader was appointed who will be responsible for soliciting members and coordinating the first meeting of the group. Working groups will meet as frequently as necessary to carry out their respective goals. Reports from the various working groups will be presented at SeaWiFS Science Team meetings as appropriate.

The purpose of a working group is to facilitate team interaction and coordination in an area of special interest. There are two types of working groups:

- 1) Formal working groups whose objectives are necessary for the SeaWiFS Project; and
- 2) Ad hoc working groups whose objectives are largely of value to its members.

Working groups focusing on regional activities would be ad hoc, whereas groups such as the Ocean Primary Productivity Working Group (OPPWG) belong to the former. Ad hoc working groups can be more flexible in terms of how frequently they meet or whether their activities are largely carried out via electronic mail. Formal working groups will act in an advisory capacity to the SeaWiFS Project, and will be expected to make formal recommendations on issues to be decided by the Science Team.

At this time, the OPPWG is the only formal working group. The identified ad hoc groups are the following (the chairs are listed in parentheses):

- a) Modeling and Data Assimilation (E. Hofmann)
- b) CZCS Reprocessing (J. Yoder)
- c) Gulf of Maine and Georges Bank (A. Thomas)
- d) North Atlantic (D. Siegel)
- e) Continental Margins (F. Müller-Karger)
- f) Eastern North Pacific and Gulf of Alaska (B.G. Mitchell)
- g) Absorption and Pigments (B.G. Mitchell and R. Bidigare)
- h) Surface photosynthetically available radiation (PAR) (J. Bishop)
- i) Biogenic Gas Fluxes (to be determined)

#### 3.2.2.1 Ad Hoc Group Descriptions

The following descriptions of two of the ad hoc working groups were provided by their chairs.

**Table 3.** Participants in SeaWiFS Executive Council Meeting held during the SeaWiFS Science Team Meeting in January 1998, in Baltimore, Maryland.

Participants	Affiliation
NASA Members	J. Cambell W. Esaias C. McClain
External Members	R. Barber J. Brock M.E. Carr P. Falkowski E. Hoffmann B.G. Mitchell D. Siegel A. Thomas C. Yentsch J. Yoder

### 1. Gulf of Maine Ocean Color Working Group

The Gulf of Maine Ocean Color Working Group was formed at the January 1998 SeaWiFS Science Team Meeting, as a forum in which ocean color interests with a geographic focus on the greater Gulf of Maine region could communicate. The purpose of the Working Group will be interactive and elastic, defined by the Working Group members. The overall goals are to:

- 1) Facilitate communication among principal investigators carrying out ocean color related research in the Gulf of Maine region; and
- 2) Where possible or desirable, foster collaboration (i.e., share geographically specific knowledge, data sets, and onerous data processing and archiving tasks).

As initial goals, the following modest strawmen were posed:

- a) To identify the community carrying out ocean color related research in the Gulf of Maine;
- b) To communicate the goals and approaches of their respective research efforts; and
- c) To identify available data sets and data processing activities.

These are just a starting point. Input is welcome and encouraged. The Working Group can be as active or as inactive as the members choose. The SeaWiFS Project is simply looking for mechanisms to maximize the scientific output and productivity resulting from satellite ocean color data.

A World Wide Web site has been established as a point of reference and communication. Through this site, the members will first aim at the above goals and proceed from there. The universal resource locator (URL) <http://wavy.umeoce.maine.edu/seawifs.html>

[.umeoce.maine.edu/seawifs.html](http://wavy.umeoce.maine.edu/seawifs.html) is active, although it is still under construction.

The membership is completely open, but carries the assumption of a willingness to communicate and interact. As there are a plethora of other science working groups related to Gulf of Maine research, this Working Group will stay closely focused on issues, data, and people with active ocean color interests and research. Being a NASA funded principal investigator (PI) is not a prerequisite.

An initial list of members was started at the Second SeaWiFS Science Team Meeting and are listed below, however, it is not a complete list. If other researchers would like to be a participant in this Working Group, please send an e-mail message to A. Thomas ([thomas@maine.maine.edu](mailto:thomas@maine.maine.edu)) with a brief note including: name, address, telephone number, e-mail address, and URL, along with a few notes (in bullet-form) on the title, goals, and focus of the ocean color related research. In addition, the researchers should send a few notes on the approach, and the satellite data or ocean color related data sets they have, or will create. The current members are W. Balch, J. Bisagni, J. Irish, B. Monger, J. O'Reilly, J. Salisbury, A. Thomas, and C. Yentsch.

### 2. Continental Margins

This forum serves to exchange information on continental margins and coastal zones. The goal is to define scientific goals for remote sensing of continental margins. The geographical domain includes global continental margins, coastal zones, zones of riverine influence, upwelling zones, marginal seas, island waters, and Great Lakes and other major inland waters. Among topics of discussion may be the relevance of continental margins in global cycles of carbon and other elements, general oceanography, resource management, advantages and limitations of remote sensing technologies and applications, developing time series of

*in situ* observations, and planning joint research efforts. A goal is to generate feedback for various international satellite missions and projects on regional and time-dependent algorithms for ocean color products, atmospheric correction, and developing strategies for merging various data (satellite and *in situ*) into coherent scientific products.

The Land Ocean Margins Server (LOMAS) was established for exchanging e-mail for this forum. The forum is open to anyone interested in the topic outlined above. To subscribe, please send an e-mail message to [listproc@marine.usf.edu](mailto:listproc@marine.usf.edu), with the message **subscribe lomas FirstName LastName** in the body of the text (not in the subject area).

Please note that the *live* feature of the list server is disabled, so disregard the password offered by the list server in reply to an initial request for subscription.

Some initial topics of discussion were proposed:

- a. The ultimate goal of this discussion group is to enable global analyses of continental margins in a remote sensing context.
- b. Should the group aim at defining provinces for enabling such analyses?
- c. How will the group identify provinces?
- d. The group needs to link up and establish a liaison with regional groups, both those defined as SeaWiFS Science Team discussion groups (e.g., Gulf of Maine and Gulf of California), and others. The group may develop a strategy of using such areas as validation for global studies.
- e. How will the group include time series data, and can the group develop a strategy to support additional series in continental margins? The group currently has the Carbon Retention in a Colored Ocean (CARIACO), CalCOFI, and the European series in the Adriatic.
- f. What testable hypotheses can be defined?

### 3.4 Participants' Addresses

Following are the names and addresses of participants of the SeaBAM workshop and/or the SeaWiFS Science Team Meeting. Members of the various teams and panels are identified with their team names(s) shown in slanted type face.

Mark Abbott  
Oregon State University  
College of Oceanic and Atmospheric Sciences  
Corvallis, OR 97331-5503  
USA  
Voice: 541-737-4045  
Fax: 541-737-2064  
Net: [mark@oce.orst.edu](mailto:mark@oce.orst.edu)

James Acker  
Raytheon STX  
NASA/GSFC/Code 902.2  
Greenbelt, MD 20771-0001  
USA  
Voice: 301-614-5435  
Fax: 301-614-5268  
Net: [acker@daac.gsfc.nasa.gov](mailto:acker@daac.gsfc.nasa.gov)

Goddard DAAC

Steven Ackleson  
SeaWiFS Science Team  
Ocean Optics Program, Code 3233  
Office of Naval Research  
800 N. Quincy Street  
Arlington, VA 22217-1906  
USA  
Voice: 703-696-4732  
Fax: 703-696-4884  
Net: [ackless@onr.navy.mil](mailto:ackless@onr.navy.mil)

Robert Arnone  
SeaWiFS Science Team  
Naval Research Laboratory  
Mail Code 7243  
Multispectral Sensing Section  
Stennis Space Center, MS 39529-5004  
USA  
Voice: 601-688-5268  
Fax: 601-688-4149  
Net: [arnone@nrlssc.navy.mil](mailto:arnone@nrlssc.navy.mil)

Kevin Arrigo  
SeaWiFS Science Team  
NASA/GSFC/Code 971  
Greenbelt, MD 20771-0001  
USA  
Voice: 301-286-9634  
Fax: 301-286-0240  
Net: [kevin@shark.gsfc.nasa.gov](mailto:kevin@shark.gsfc.nasa.gov)

Karen Baith  
SeaWiFS Project  
SAIC General Sciences Corporation  
NASA/GSFC/Code 970.2  
Greenbelt, MD 20771-0001  
USA  
Voice: 301-286-4759  
Fax: 301-286-1775  
Net: [settle@shark.gsfc.nasa.gov](mailto:settle@shark.gsfc.nasa.gov)

William Balch  
Bigelow Laboratory  
P.O. Box 475, McKown Point  
West Boothbay Harbor, ME 04575-9999  
USA  
Voice: 207-633-9600  
Fax: 207-633-9641  
Net: [bbalch@bigelow.org](mailto:bbalch@bigelow.org)

Susan Banahan  
NOAA Coastal Ocean Program  
1315 East-West Highway  
Room 9608  
Silver Spring, MD 20910-3282  
USA  
Voice: 301-713-3338 ext. 115  
Fax: 301-713-4044  
Net: [sbanahan@cop.noaa.gov](mailto:sbanahan@cop.noaa.gov)

E.R. Firestone and S.B. Hooker

Robert Barnes SAIC General Sciences Corporation NASA/GSFC/Code 970.2 Greenbelt, MD 20771-0001 USA Voice: 301-286-0501 Fax: 301-286-1775 Net: rbarnes@calval.gsfc.nasa.gov	SeaWiFS Project	Paul Bissett Code 7212 Naval Research Laboratory 4555 Overlook Avenue Washington, DC 20375-5351 USA Voice: 202-767-8278 Fax: 202-404-8894 Net: bissett@rsd.nrl.navy.mil	SeaWiFS Science Team
William Barnes NASA/GSFC/Code 970 Greenbelt, MD 20771-0001 USA Voice: 301-286-8670 Fax: 301-286-1761 Net: wbarnes@neptune.gsfc.nasa.gov		John Brock NOAA Coastal Services Center 2234 South Hobson Avenue Charleston Naval Base Charleston, SC 29405-2413 USA Voice: 803-974-6239 Fax: 803-974-6224 Net: jbrock@csc.noaa.gov	SeaWiFS Science Team
Michael Behrenfeld BNL/OAS Division Bldg. 318 Upton, NY 11973-5000 USA Voice: 516-344-3069 Fax: 516-344-3246 Net: mjb@warrior.das.bnl.gov	SeaWiFS Science Team	Christopher Brown NOAA/NESDIS E/RRA3 NSC Room 105 Washington, DC 20233-0001 USA Voice: 301-763-8102 Fax: 301-763-8020 Net: chrisb@orbit.nesdis.noaa.gov	SeaWiFS Science Team
Juli Berwald Univ. of Southern California University Park Dept. of Biological Sciences Los Angeles, CA 90089-0373 USA Voice: 213-740-5813 Fax: 213-740-8123 Net: berwald@scf.usc.edu		Robert Caffrey NASA/GSFC/Code 970.2 Greenbelt, MD 20771-0001 USA Voice: 301-286-0846 Fax: 301-286-1775 Net: bcaffrey@seawifs.gsfc.nasa.gov	SIMBIOS Project
Robert Bidigare Univ. of Hawaii Manoa Department of Oceanography 1000 Pope Road Honolulu, HI 96822-2336 USA Voice: 808-956-6567 Fax: 808-956-9516 Net: bidigare@iniki.soest.hawaii.edu	SeaWiFS Science Team	Janet Campbell UNH/OPAL/EOS 142 Morse Hall 39 College Road Durham, NH 03824-2524 USA Voice: 603-862-1070 Fax: 603-862-0188 Net: campbell@kelvin.unh.edu	SeaWiFS Science Team
James Bisagni Univ. of Massachusetts Dartmouth/CMST 285 Old Westport Road Dartmouth, MA 02747-2300 USA Voice: 508-999-8359 Fax: 508-999-8197 Net: bisagni@fish1.gso.uri.edu	SeaWiFS Science Team	Kendall Carder Univ. of South Florida Dept. of Marine Science 140 Seventh Avenue, South St. Petersburg, FL 33701-5016 USA Voice: 813-553-3952 Fax: 813-553-1148 Net: kcarder@monty.marine.usf.edu	MODIS Science Team
James Bishop Columbia University Lamont Doherty Geological Observatory Armstrong Hall 2880 Broadway New York, NY 10025-7886 USA Voice: 212-678-5620 Fax: 212-678-5622 Net: cojkb@i0.giss.nasa.gov	SeaWiFS Science Team	Mary-Elena Carr MS 300-323 Jet Propulsion Laboratory 4800 Oak Grove Drive Pasadena, CA 91109-8099 USA Voice: 818-354-5097 Fax: 818-393-6720 Net: mec@pacific.jpl.nasa.gov	SeaWiFS Science Team

# SeaWiFS Prelaunch Technical Report Series Final Cumulative Index

Fransisco Chavez

MBARI

P.O. Box 628

7700 Sandholdt Road

Moss Landing, CA 95039-0628

USA

Voice: 408-775-1709

Fax: 408-775-1645

Net: chfr@mbari.org

Curtiss Davis

Naval Research Laboratory

Code 7212

4555 Overlook Avenue, SW

Washington, DC 20357-5320

USA

Voice: 202-767-9296

Fax: 202-404-8894

Net: davis@rsd.nrl.navy.mil

SeaWiFS Science Team

James Christian

Univ. Space Research Association

NASA/GSFC/Code 970.2

Greenbelt, MD 20771-0001

USA

Voice: 301-286-9911

Fax: 301-286-1775

Net: jrc@bluefin.gsfc.nasa.gov

Pierre-Yves Deschamps

Université de Lille1

Laboratoire d'Optique Atmosphérique

F-59655 Villeneuve d'Ascq

FRANCE

Voice: 33-3-20-43-66-97

Fax: 33-3-20-43-43-42

Net: pyd@loa.univ.lille1.fr

Mary Cleave

NASA/GSFC/Code 970.2

Greenbelt, MD 20771-0001

USA

Voice: 301-286-1404

Fax: 301-286-1775

Net: mary@seawifs.gsfc.nasa.gov

SeaWiFS Project

Tom Dickey

Univ. of California at Santa Barbara

ICESC and Dept. of Geography

Santa Barbara, CA 93106-3060

USA

Voice: 805-893-7354

Fax: 805-893-2578

Net: tommy@icesc.ucsb.edu

Paula Coble

SeaWiFS Science Team

Department of Marine Science

Univ. of South Florida

140 Seventh Avenue, South

St. Petersburg, FL 33701-5016

USA

Voice: 813-553-1631

Fax: 813-553-1189

Net: pcoble@marine.usf.edu

Glenn Cota

SeaWiFS Science Team

Center for Coastal Physical Oceanography

Old Dominion University

768 West 52nd Street

Norfolk, VA 23529-2026

USA

Voice: 804-683-5835

Fax: 804-683-5550

Net: cota@ccpo.odu.edu

Gene Eplee

SeaWiFS Project

SAIC General Sciences Corporation

NASA/GSFC/Code 970.2

Greenbelt, MD 20771-0001

USA

Voice: 301-286-0953

Fax: 301-286-1775

Net: eplee@calval.gsfc.nasa.gov

Wayne Esaias

SeaWiFS Science Team

NASA/GSFC/Code 971

MODIS Science Team

Greenbelt, MD 20771-0001

USA

Voice: 301-286-5465

Fax: 301-286-0240

Net: wayne@petrel.gsfc.nasa.gov

Robert Evans

MODIS Science Team

MPO/RSMAS/Univ. of Miami

4600 Rickenbacker Causeway

Miami, FL 33149-1098

USA

Voice: 305-364-4064

Fax: 305-361-4799

Net: bob@rsmas.miami.edu

Arthur Cracknell

SeaWiFS Science Team

Univ. of Dundee

Applied Physics and Electrical and Mechanical En-

gineering

Perth Road

Dundee, Scotland DD1 4HN

UNITED KINGDOM

Michael Darzi

SeaWiFS Project

SAIC General Sciences Corporation

NASA/GSFC/Code 970.2

Greenbelt, MD 20771-0001

USA

Voice: 301-286-9150

Fax: 301-286-1775

Net: darzi@calval.gsfc.nasa.gov

Paul Falkowski

SeaWiFS Science Team

BNL/OAS Division

Bldg. 318

Upton, NY 11973-5000

USA

Voice: 516-344-2861

Fax: 516-344-3246

Net: falkowski@bnl.gov

E.R. Firestone and S.B. Hooker

Gene Feldman  
NASA/GSFC/Code 970.2  
Greenbelt, MD 20771-0001  
USA  
Voice: 301-286-9428  
Fax: 301-286-1775  
Net: gene@seawifs.gsfc.nasa.gov

SeaWiFS Project

Sonia Gallegos  
Naval Research Laboratory  
Code 7240, Remote Sensing  
Stennis Space Center, MS 39529-5004  
USA  
Voice: 601-688-4867  
Fax: 601-688-4149  
Net: gallegos@snaps.nrlssc.navy.mil

SeaWiFS Science Team

Piotr Flatau  
Scripps Institution of Oceanography  
9500 Gilman Drive  
LaJolla, CA 92093-0221  
USA  
Voice: 619-534-102  
Fax: 619-534-7452  
Net: pflatau@ucsd.edu

Carlo Garcias  
Fundacao Universidade do Rio Grande  
Dept. of Oceanography  
Caixa Postal 474  
Rua Alfredo Huch 475  
Rio Grande, RS 96201-900  
BRAZIL

Mick Follows  
Massachusetts Institute of Technology  
Dept. of Earth, Atmospheric, and Planetary Science  
Bldg. 54, Room 1412  
77 Massachusetts Avenue  
Cambridge, MA 02139-4307  
USA  
Voice: 617-253-2454  
Fax: 617-253-4464  
Net: mick@plume.mit.edu

Sara A. Garver  
California State Polytechnic University, Pomona  
Dept. of Geography and Anthropology  
3801 West Temple Avenue  
Pomona, California 91768-4001  
USA  
Voice: 909-869-3581  
Fax: 909-869-3586  
Net: sagarver@csupomona.edu

Bryan Franz  
SAIC General Sciences Corporation  
NASA/GSFC/Code 970.2  
Greenbelt, MD 20771-0001  
USA  
Voice: 301-286-5429  
Fax: 301-286-1775  
Net: franz@seawifs.gsfc.nasa.gov

SeaWiFS Project

Gilberto Gaxiola-Castro  
CICESE  
Km. 107 Carretera Tijuana Ensenada Apt.  
Ensenada Baja, 2732  
MEXICO  
Voice: 617-45050  
Fax: 617-500545  
Net: ggaxiola@cicese.mx

Robert Frouin  
Scripps Institution of Oceanography  
Mail Code 0221  
9500 Gilman Drive  
La Jolla, CA 92093-0221  
USA  
Voice: 619-534-6243  
Fax: 619-534-7452  
Net: rfrouin@ucsd.edu

Roman Glazman  
Jet Propulsion Laboratory  
MS 300-323  
4800 Oak Grove Drive  
Pasadena, CA 91109-8099  
USA  
Voice: 818-354-7151  
Fax: 818-393-6720  
Net: reg@foggy.jpl.nasa.gov

Gary Fu  
SAIC General Sciences Corporation  
NASA/GSFC/Code 970.2  
Greenbelt, MD 20771-0001  
USA  
Voice: 301-286-7107  
Fax: 301-286-1775  
Net: gfu@shark.gsfc.nasa.gov

SeaWiFS Project

David Glover  
Woods Hole Oceanographic Institution  
Dept. of Marine Chemistry and Geochemistry  
Woods Hole, MA 02543-1541  
USA  
Voice: 508-289-2656  
Fax: 508-457-2193  
Net: dglover@whoi.edu

Hajime Fukushima  
Tokai University  
317 Nishino  
Numazu, Shizuoka 410-03  
JAPAN  
Voice: 81-559-68-1211  
Fax: 81-559-68-1155  
Net: hajime@fksh.fc.u.tokai.ac.jp

SeaWiFS Science Team

James F.R. Gower  
Institute of Ocean Sciences  
9860 W. Saanich Road  
Sidney, BC V8L 4B2  
CANADA  
Voice: 250-363-6558  
Fax: 250-363-6310  
gowerj@dfo-mpo.gc.ca

**SeaWiFS Prelaunch Technical Report Series Final Cumulative Index**

**Robert Green**  
 Jet Propulsion Laboratory  
 4800 Oak Grove Drive  
 Pasadena, CA 95039-0628  
 USA  
 Voice: 818-354-913  
 Fax: 818-354-4406  
 Net: rog@gomez.jpl.nasa.gov

**Watson Gregg**  
 NASA/GSFC/Code 971  
 Greenbelt, MD 20771-0001  
 USA  
 Voice: 301-286-3464  
 Fax: 301-286-0240  
 Net: gregg@smoc1.gsfc.nasa.gov

**Marilaure Grégoire**  
 GHER University of Liege  
 BS Sart-Tilman  
 400 Liege  
 BELGIUM  
 Voice: 324-43-66-33-54  
 Fax: 324-43-36-23-55  
 Net: mgregoreplug.ac.be

**David Halpern**  
 Jet Propulsion Laboratory  
 MS 300-323  
 4800 Oak Grove Drive  
 Pasadena, CA 91109-8099  
 USA  
 Voice: 818-354-5327  
 Fax: 818-393-6720  
 Net: halpern@pacific.jpl.nasa.gov

**Lawrence Harding** SeaWiFS Science Team  
 Univ. of Maryland System  
 Horn Point Environmental Laboratory  
 P.O. Box 775  
 Center for Environmental and Estuarine Studies  
 Cambridge, MD 21613-0775  
 USA  
 Voice: 410-221-8297  
 Fax: 410-221-8990  
 Net: larry@kestrel.umd.edu

**Steven Hawest†**  
 Univ. of South Florida  
 Dept. of Marine Science  
 140 Seventh Avenue, South  
 St. Petersburg, FL 33701-5016  
 USA

**Eileen Hofmann** SeaWiFS Science Team  
 Old Dominion University  
 Center for Coastal Physical Oceanography  
 Crittenton Hall  
 768 West 52nd Street  
 Norfolk, VA 23529-2026  
 USA  
 Voice: 757-683-5334  
 Fax: 757-683-5550  
 Net: hofmann@ccpo.odu.edu

**Stanford Hooker**  
 NASA/GSFC/Code 970.2  
 Greenbelt, MD 20771-0001  
 USA  
 Voice: 301-286-9503  
 Fax: 301-286-1775  
 Net: stan@ardbeg.gsfc.nasa.gov

**SeaWiFS Project**

**James Irish** SeaWiFS Science Team  
 Woods Hole Oceanographic Institution  
 Dept. of Applied Ocean Physics and Engineering  
 Mail Stop 17  
 86 Water Street  
 Woods Hole, MA 02543-1052  
 USA  
 Voice: 508-289-2732  
 Fax: 508-457-2195  
 Net: jirish@whoi.edu

**Alice Isaacman** SeaWiFS Project  
 SAIC General Sciences Corporation  
 NASA/GSFC/Code 970.2  
 Greenbelt, MD 20771-0001  
 USA  
 Voice: 301-286-7108  
 Fax: 301-286-1775  
 Net: alice@akumal.gsfc.nasa.gov

**Rodolfo Iturriaga** SeaWiFS Science Team  
 USC, University Park  
 Hancock Institute for Marine Studies  
 Los Angeles, CA 90089-0371  
 USA  
 Voice: 213-740-5769  
 Fax: 213-740-8123  
 Net: iturriag@mizar.usc.edu

**Mati Kahru**  
 Scripps Institution of Oceanography  
 2208 Sverdrup Hall  
 La Jolla, CA 92093-0218  
 USA  
 Voice: 619-534-8947  
 Fax: 619-534-2997  
 Net: mati@spode.ucsd.edu

**Daniel Kamykowski** SeaWiFS Science Team  
 North Carolina State University  
 Dept. of Marine, Earth, and Atmospheric Science  
 Jordan Hall, Room 1125  
 P.O. Box 8208  
 Raleigh, NC 27695-0001  
 USA  
 Voice: 919-515-7894  
 Fax: 919-515-7802  
 Net: dan\_kamykowski@ncsu.edu

**Lakshmi Kantha** SeaWiFS Science Team  
 Univ. of Colorado, Boulder  
 Dept. of Aerospace Engineering Sciences  
 Campus Box 431, CCAR  
 Boulder, CO 80309-0431  
 USA  
 Voice: 303-492-3014  
 Fax: 303-492-2825  
 Net: kantha@colorado.edu

† Address as of the date of the SeaBAM Workshop

Raphael Kudela                    SeaWiFS Science Team  
 Monterey Bay Aquarium Research Institute  
 P.O. Box 628  
 7700 Sandholm Road  
 Moss Landing, CA 95039-0628  
 USA  
 Voice: 408-775-1741  
 Fax: 408-775-1620  
 Net: kura@mbari.org

Norman Kuring                    SeaWiFS Project  
 NASA/GSFC/Code 970.2  
 Greenbelt, MD 20771-0001  
 USA  
 Voice: 301-286-2264  
 Fax: 301-286-1775  
 Net: norman@tursiops.gsfc.nasa.gov

Gregory Leptoukh                    Goddard DAAC  
 Research and Data Systems Corporation  
 NASA/GSFC/Code 902.2  
 Greenbelt, MD 20771-0001  
 USA  
 Voice: 301-614-5253  
 Fax: 301-614-5268  
 Net: leptoukh@daac.gsfc.nasa.gov

Paul Lyon  
 EG&G Services Inc.  
 8 Cold Spring Road  
 Southampton, MA 01073-9462  
 USA  
 Voice: 413-527-9897  
 Fax: 413-527-9984  
 Net: lyon@osb.wff.nasa.gov

Stephane Maritorena                    SeaWiFS Science Team  
 NASA/GSFC/Code 970.2  
 Greenbelt, MD 20771-0001  
 USA  
 Voice: 301-286-9975  
 Fax: 919-515-1775  
 Net: stephane@calval.gsfc.nasa.gov

John Marra                    SeaWiFS Science Team  
 Columbia University  
 Dept. of Marine Biology  
 Lamont-Doherty Earth Observatory  
 61 Route 9W  
 Palisades, NY 10964-8000  
 USA  
 Voice: 914-365-8891  
 Fax: 914-365-8150  
 Net: marra@ldeo.columbia.edu

Nancy Maynard  
 NASA HQ/Code YS  
 300 E Street, SW  
 Washington, DC 20546-0005  
 USA  
 Voice: 202-358-2559  
 Fax: 202-358-2770  
 Net: nmaynard@hq.nasa.gov

John McCarthy  
 Orbital Sciences Corporation  
 21700 Atlantic Boulevard  
 Dulles, VA 20166-6801  
 USA  
 Voice: 703-406-5504  
 Fax: 703-406-3562  
 Net: mcarthy.john@orbital.com

Charles McClain                    SeaWiFS Science Team  
 NASA/GSFC/Code 971  
 Greenbelt, MD 20771-0001  
 USA  
 Voice: 301-286-5377  
 Fax: 301-286-2717  
 Net: mcclain@calval.gsfc.nasa.gov

Dennis McGillicuddy                    SeaWiFS Science Team  
 Woods Hole Oceanographic Institution  
 Bigelow 2096  
 Mail Stop 11  
 98 Water Street  
 Woods Hole, MA 02543-1054  
 USA  
 Voice: 508-289-2683  
 Fax: 508-457-2197  
 Net: dmcgillicuddy@whoi.edu

Mark Miller  
 Brookhaven National Laboratory  
 Dept. of Applied Science  
 Upton, NY 11973-5000  
 USA  
 Voice: 516-344-2958  
 Fax: 516-344-3246  
 Net: miller@bnlofn.das.bnl.gov

Richard Miller  
 Naval Research Laboratory  
 Mail Code 7243  
 Multispectral Sensing Section  
 Stennis Space Center, MS 39529-5044  
 USA  
 Voice: 228-688-1904  
 Fax: 228-688-1777  
 Net: rmiller@sscpn.ssc.nasa.gov

B. Greg Mitchell                    SeaWiFS Science Team  
 UCSD/MRD 0218  
 La Jolla, CA 92093-0218  
 USA  
 Voice: 619-534-2687  
 Fax: 619-534-2997  
 Net: bgmitchell@ucsd.edu

John Moisan  
 Scripps Institution of Oceanography  
 SIO Dept. 0230  
 9500 Gilman Drive  
 La Jolla, CA 92093-0230  
 USA  
 Voice: 619-534-7153  
 Fax: 619-534-7931  
 Net: moisan@vanilla.ucsd.edu

## SeaWiFS Prelaunch Technical Report Series Final Cumulative Index

Bruce Monger Cornell University 4176 Snee Hall Center for the Environment Ithaca, NY 14853-1504 USA Voice: 607-255-4176 Fax: 607-254-4780 Net: monger@geology.cornell.edu	<b>SeaWiFS Science Team</b>	James Nelson Skidaway Institute of Oceanography 10 Ocean Science Circle Savannah, GA 31411-1011 USA Voice: 912-598-2476 Fax: 912-598-2310 Net: nelson@skio.peachnet.edu	<b>SeaWiFS Science Team</b>
John Morrison North Carolina State University Dept. of Marine, Earth, and Atmospheric Sciences 1129 Jordon Hall, Box 8208 Raleigh, NC 27695-0001 USA Voice: 919-515-7449 Fax: 919-515-7802 Net: john_morrison@ncsu.edu		Norman Nelson Bermuda Biological Station for Research 17 Biological Station Lane Ferry Reach, St. Georges GE01 BERMUDA Voice: 441-297-1880 ext. 303 Fax: 441-297-8143 Net: norm@bbsr.edu	<b>SeaWiFS Science Team</b>
Gerald Moore Plymouth Marine Laboratory Prospect Place, West Hoe Plymouth, PL1 3DH UNITED KINGDOM Voice: 44-1-752-222-772 Fax: 44-1-752-670-637 Net: gfm@unixb.nerc-pml.ac.uk		Jay O'Reilly NOAA/NMFS 128 Tarzwell Drive Narragansett, RI 02882-1129 USA Voice: 401-782-3267 Fax: 401-782-3201 Net: oreilly@fish1.gso.uri.edu	<b>SeaWiFS Science Team</b>
André Morel Laboratoire de Physique et Chimie Marines Université de Pierre et Marie Curie Unité 2067 CNRS BP 8 Villefranche-sur-Mer 06238 FRANCE Voice: 33-14-93-76-37-44 Fax: 33-14-93-76-37-39 Net: morel@ccrv.abs-vlfr.fr	<b>SeaWiFS Science Team</b>	Nils Odegard Raytheon STX 4400 Forbes Boulevard Lanham, MD 20706-4385 USA Voice: 301-794-5350 Fax: 301-441-1853 Net: nodegard@stx.com	
James Mueller SDSU/CHORS 6505 Alvarado Road, Suite 206 San Diego, CA 92120-5005 USA Voice: 619-594-2230 Fax: 619-594-4570 Net: j.mueller@chors.sdsu.edu	<b>SeaWiFS Science Team</b>	Scott Pegau Oregon State University College of Oceanic and Atmospheric Sciences Oceanography Administration Bldg. 104 Corvallis, OR 97331-5503 USA Voice: 541-737-4635 Fax: 541-737-2064 Net: spegau@oce.orst.edu	
Frank Müller-Karger Univ. of South Florida Dept. of Marine Sciences 140 Seventh Avenue, South St. Petersburg, FL 33701-5016 USA Voice: 813-553-1186 Fax: 813-553-1103 Net: carib@carbon.marine.usf.edu	<b>SeaWiFS Science Team</b>	John Porter Univ. of Hawaii 2525 Correa Road Honolulu, HI 96822-2285 USA Voice: 808-956-6483 Fax: 808-956-3188 Net: porter@soest.hawaii.edu	
Raymond Najjar Pennsylvania State University 503 Walker Building University Park, PA 16802-5013 USA Voice: 814-863-1586 Fax: 814-865-3663 Net: najjar@essc.psu.edu	<b>SeaWiFS Science Team</b>	Dominic Preiswerk Pennsylvania State University Dept. of Meteorology, Earth, and Mineral Sciences 503 Walker Building University Park, PA 16802-5013 USA Voice: 814-863-1036 Fax: 814-865-3663 Net: rgn1@psu.edu	

E.R. Firestone and S.B. Hooker

Dale Robinson  
 NASA/GSFC/Code 971  
 Greenbelt, MD 20771-0001  
 USA  
 Voice: 301-286-5057  
 Fax: 301-286-0240  
 Net: dale@neptune.gsfc.nasa.gov

*SeaWiFS Science Team*

Sergio Signorini  
 SAIC General Sciences Corporation  
 NASA/GSFC/Code 970.2  
 Greenbelt, MD 20771-0001  
 USA  
 Voice: 301-286-9891  
 Fax: 301-286-1775  
 Net: sergio@bluefin.gsfc.nasa.gov

*SeaWiFS Project*

Wayne Robinson  
 SAIC General Sciences Corporation  
 NASA/GSFC/Code 970.2  
 Greenbelt, MD 20771-0001  
 USA  
 Voice: 301-286-3883  
 Fax: 301-286-1775  
 Net: wayne@calval.gsfc.nasa.gov

*SeaWiFS Project*

Heidi Sosik  
 Woods Hole Oceanographic Institution  
 Biology Department  
 Mail Stop 32  
 Woods Hole, MA 02543-1049  
 USA  
 Voice: 508-289-2311  
 Fax: 508-457-2134  
 Net: hsosik@whoi.edu

Sei-ichi Saitoh  
 Hokkaido University  
 Faculty of Fisheries  
 3-1-1, Minato-Cho  
 Hakodate, 041  
 JAPAN  
 Net: ssaitoh@salmon.fish.hokudai.ac.jp

Brian Schieber  
 SAIC General Sciences Corporation  
 NASA/GSFC/Code 970.2  
 Greenbelt, MD 20771-0001  
 USA  
 Voice: 301-286-1440  
 Fax: 301-286-1775  
 Net: schieb@shark.gsfc.nasa.gov

*SeaWiFS Project*

Knut Stamnes  
 Univ. of Alaska, Fairbanks  
 508A Elvey Building, Room 903  
 Koyuk Drive  
 P.O. Box 757320  
 Fairbanks, AK 99775-7320  
 USA  
 Voice: 907-474-7368  
 Fax: 907-474-7290  
 Net: knut@kaja.gi.alaska.edu

George Serafino  
 NASA/GSFC/Code 902.2  
 Greenbelt, MD 20771-0001  
 USA  
 Voice: 301-614-538  
 Fax: 301-614-5268  
 Net: serafino@daac.gsfc.nasa.gov

*Goddard DAAC*

Petra Stegmann  
 Univ. of Rhode Island  
 Graduate School of Oceanography  
 215 South Ferry Road  
 Narragansett, RI 02882-1197  
 USA  
 Voice: 401-874-6863  
 Fax: 401-874-6728  
 Net: petra@uri.gso.uri.edu

Kusiel Shifrin  
 Oregon State University  
 College of Oceanic and Atmospheric Sciences  
 Oceanography Administration  
 Bldg. 104  
 Corvallis, OR 97331-5503  
 USA  
 Voice: 541-737-2016  
 Fax: 541-737-2064  
 Net: shifrinx@ucs.orst.edu

*SeaWiFS Science Team*

Andrew Thomas  
 Univ. of Maine  
 School of Marine Sciences  
 5741 Libby Hall  
 Orono, ME 04401-5741  
 USA  
 Voice: 207-581-4335  
 Fax: 207-581-4388  
 Net: thomas@maine.maine.edu

David Siegel  
 ICEES/UCSB  
 Santa Barbara, CA 93106-3060  
 USA  
 Voice: 805-893-4547  
 Fax: 805-893-2578  
 Net: davey@ices.ucsb.edu

*SeaWiFS Science Team*

Compton J. Tucker  
 NASA/GSFC/Code 923  
 Greenbelt, MD 20771-0001  
 USA  
 Voice: 301-286-7122  
 Fax: 301-286-1775  
 Net: compton@kratmos.gsfc.nasa.gov

M. Grey Valenti  
 SAIC General Sciences Corporation  
 NASA/GSFC/Code 970.2  
 Greenbelt, MD 20771-0001  
 USA  
 Voice: 301-286-3288  
 Fax: 301-286-1775  
 Net: grey@calval.gsfc.nasa.gov

*SeaWiFS Project*

**SeaWiFS Prelaunch Technical Report Series Final Cumulative Index**

Eric Vermote Univ. of Maryland NASA/GSFC/Code 923 Greenbelt, MD 20771-0001 USA Voice: 301-286-6232 Fax: 301-286-1775 Net: eric@kratmos.gsfc.nasa.gov	<i>MODIS Science Team</i>	Charles Yentsch Bigelow Laboratory for Ocean Sciences Box 475 McKown Point Road West Boothbay Harbor, ME 04575-0475 USA Voice: 305-295-9536 Fax: 305-295-9641 Net: cyentsch@bigelow.org	<i>SeaWiFS Science Team</i>
Charles Vorosmarty Univ. of New Hampshire ISEOS Morse Hall 39 College Road Durham, NH 03824-3525 USA Voice: 603-862-1792 Fax: 603-862-0188 Net: charles.vorosmarty@unh.edu	<i>SeaWiFS Science Team</i>	James Yoder Univ. of Rhode Island Graduate School of Oceanography Narragansett, RI 02882-9999 USA Voice: 401-874-6864 Fax: 401-874-6720 Net: yoder@uri.gso.uri.edu	<i>SeaWiFS Science Team</i>
Menghua Wang JCET NASA/GSFC/Code 970.2 Greenbelt, MD 20771-0001 USA Voice: 301-286-6421 Fax: 301-286-1775 Net: wang@simbios.gsfc.nasa.gov	<i>SIMBIOS Project</i>	Shari Yvon-Lewis AOML 4301 Rickenbacker Causeway Miami, FL 33149-1097 USA Voice: 305-361-4441 Fax: 305-361-4392 Net: syvon@aoml.noaa.gov	<i>SeaWiFS Science Team</i>
Kirk Waters NOAA Coastal Services Center 2234 South Hobson Avenue Charleston, SC 29405-2413 USA Voice: 803-974-6227 Fax: 803-974-6224 Net: kwaters@csc.noaa.gov		Edward Zalewski Univ. of Arizona Optical Sciences Center Remote Sensing Group Tucson, AZ 85721-0001 USA Voice: 520-621-4243 Fax: 520-621-8292 Net: ed.zalewski@opt-sci.arizona.edu	<i>SeaWiFS Science Team</i>
Alan Weidemann Naval Research Laboratory Code 7331 Stennis Space Center, MS 39529-0001 USA Voice: 601-688-5253 Fax: 601-688-5379 Net: alanw@nrl.ssc.navy.mil	<i>SeaWiFS Science Team</i>	J. Ronald Zaneveld Oregon State University Oceanography Administration Building, Room 104 College of Oceanic and Atmospheric Sciences Corvallis, OR 97331-5503 USA Voice: 541-737-3571 Fax: 541-737-2064 Net: zaneveld@oce.orst.edu	<i>SeaWiFS Science Team</i>
Robert Woodward SAIC General Sciences Corporation NASA/GSFC/Code 971 Greenbelt, MD 20771-0001 USA Voice: 301-286-1441 Fax: 301-286-0240 Net: woodward@salmo.gsfc.nasa.gov		Giuseppe Zibordi Space Applications Institute Joint Research Centre Marine Environment Unit Ispra, Varese I-21020 ITALY Voice: 39-332-785-902 Fax: 39-332-789-034 Net: giuseppe.zibordi@jrc.it	<i>SeaWiFS Science Team</i>

## CUMULATIVE INDEX

Unless otherwise indicated, the index entries that follow refer to some aspect of the SeaWiFS instrument or project. For example, the mission overview index entry refers to an overview of the SeaWiFS mission.

## - A -

## absorption study:

pressure and oxygen, 13(ch. 3).

absorption correction, 13(19–20).

absorption features, 40(15–16, Fig. 7 p. 17, 22).

*see also* oxygen absorption band.

## acceptance report:

prelaunch, *see* SeaWiFS instrument.

addenda, 12(3–8); 18(3–22); 24(2–5); 36(3–12); 43(4–20).

Advanced Very High Resolution Radiometer, *see* AVHRR.

## aerosols:

atmospheric, 5(15); 19(26–27, 30–32, Fig. 16 p. 31); 25(19); 40(34).

models, *see* models, aerosol.

optical depth, 5(38); 19(ch. 1, 30); 25(55); 33(3).

airborne spectral radiometry, 5(7–8).

aircraft calibration technique, 3(Fig. 19 p. 27).

algorithms, 1(3, 17); 4(2); Vol. 28.

atmospheric correction, 1(19); 3(1–2, Fig. 4 p. 5, 16, 23, 27–28, 31, 32–34); 8(4, Table 1 p. 14, 17, Table 4 p. 21); 13(1, 4, 9, 27); 17(16); 18(11–12); 21(19–20); 28(6); 33(3–11).

band-ratio, 29(8–9, Tables 4–6 p. 9, 9–12, Fig. 8 p. 17, Fig. 9 p. 19).

binning and interpreting, 32(65–69).

bio-optical, Vol. 5; 12(3–5); 20(ch. 3); 25(5).

data, 9(1); 12(3–4).

database development, 3(28).

derived products, 3(27–28); 13(1).

development, 1(5); 3(23, 27–35, Fig. 22 p. 33); 5(Table 4 p. 11); 8(4, 10).

diffuse attenuation coefficient, prelaunch, 41(ch. 2).

field studies, 3(30–32, Fig. 22 p. 33, 34–35).

input values, 13(Table 16 p. 44).

iterative fitting, 33(33).

level-2 processing, 28(ch. 5).

linearity and stability, 5(12).

optical measurements, Vol. 5; Vol. 25.

out-of-band correction, 41(ch. 3).

pigment, 3(28, 29); 8(24); 13(1, 12); 18(3, 4, 14); 24(3); Vol. 29.

primary productivity, Vol. 42.

spatial binning, 24(3); Vol. 32.

stray light correction, 41(ch. 4).

temporal binning, Vol. 32.

validation of, 1(3); 8(16, Table 4 p. 21).

*see also* atmospheric correction, algorithm.

*see also* bio-optical, algorithm.

*see also* GAC.

*see also* level-2 processing.

*see also* NET, pigment algorithm.

algorithms *cont.*

*see also* primary productivity.

*see also* Protocols Workshop.

## along-scan:

correction, 31(23, Table 11 p. 28, 29, Table 12 p. 29).

responses, 31(20–21, Table 8 p. 21, Table 14 p. 65).

test results, 31(29, Figs. 19–34 p. 30–45, Table 13 pp. 46–48, Figs. 35–50 p. 49–64).

## along-track:

direction, 31(Figs. 7–8 p. 13, 16, Figs. 17–18 pp. 26–27).

response, 3(38); 31(21–23, Table 9 p. 22).

*see also* propagation model.

## AMT, Vol. 35.

biogeochemical measurements, 35(3).

bio-optical measurements, 35(2–3).

circulation and backscatter, 35(31, 46, Fig. 29 p. 48).

cruise participants, 35(83).

dissolved gases, 35(46, Fig. 31 p. 50).

fluorometry and photochemistry, 35(25–26, Fig. 12 p. 29, 39, Figs. 23–24 p. 41–42, 43).

future plans, 35(61).

hydrography, 35(18, Fig. 10 p. 24, 31, Figs. 17–18 pp. 34–35, 36).

inorganic nutrients, 35(31, 46, Fig. 30 p. 49).

lessons learned, 35(61).

methodology, 35(2).

optics, 35(25, Tables 8–9 p. 25, Fig. 11 p. 27, 36–39, Fig. 20 p. 38, Figs. 21–22 pp. 40–41).

photosynthesis and calcification, 35(26, Fig. 13 p. 29, 43, Figs. 25–26 pp. 44–45).

physical measurements, 35(2).

pigment extractions, 35(26, 43, Fig. 27 p. 45, Tables J1–J3 pp. 77–79).

size fractionation, 35(31, Fig. 26 p. 45, 46).

zooplankton characterization, 35(14–15, 26, Fig. 14 p. 30, 46, Fig. 28 p. 47).

*see also* cruise synopsis.

*see also* cruise track.

*see also* instrumentation, AMT.

analytical methods, 5(33–39); 25(ch. 6).

angular response, 5(12, 16); 25(16).

normalized, 39(Tables 28–29 p. 60).

## ancillary:

data climatologies, 13(2, ch. 7, and Plates 16–18).

data sets, 8(7); 15(7); 19(ch. 6, ch. 7).

measurements, 5(8, 9, 13–14, 20, 27–28, 30, 33); 25(11, 35–38).

observations, 5(9); 25(42).

*see also* data, ancillary.

## animation:

meteorological data sets, 13(41–42).

ozone data sets, 13(41–42).

ascender node, Vol. 2.

computation methods, 2(1–2).

tilt strategy, 2(Table 1 p. 2).

Atlantic Meridional Transect, *see* AMT.

atmospheric aerosols, *see* aerosols, atmospheric.

atmospheric carbon dioxide, 13(30); 42(Fig. 1 p. 4, 17, 18).  
 cycles, 42(30).  
 atmospheric conditions, 9(6–7).  
 atmospheric contributions, 9(4–6).  
 atmospheric correction, 1(3, 5, 7); 3(1, 2, Fig. 4 p. 5, 8, 13, 23, 24, 27, 28–29, 31, 32–34); 4(1); 5(1, 3, 6, 7, 10, 13); 8(4, 6, 7, 26–27, 30–31, 36–37, 42); 14(1); 17(6, 16); 18(13); 19(ch. 1, Fig. 1 p. 11); 21(19–20); 25(34); 33(3–11, 17–18, 22, 25, 28, 30–33, 36–38, 40, 43); 38(14, Fig. 9 p. 15); 39(33).  
 subgroup, 18(11–12).  
*see also* algorithms, atmospheric correction.

atmospheric measurements, 5(2, 28–29); 25(38–39).

atmospheric oxygen:

abundance, 42(Fig. 3 p. 7).

atmospheric transmittance, 5(6, 37, 38); 9(5–6); 13(3, 4, 16, Figs. 16–17 pp. 18–19, 19–20); 19(26–27, 30, Fig. 16 p. 31, 32); 21(4); 25(9, 54, 55); 27(21–23); 28(9); 33(6, 8, Fig. 7 p. 10, 11); 40(Fig. 11 p. 27, Fig. 12b p. 28, Tables 13–15 pp. 29–31, Table 18 p. 36, 36–38).

at-satellite radiances, 15(7–13, Table 10 p. 11).

AVHRR:

deriving vegetation index, 7(2).  
 GAC data, 7(3–4).  
 LAC data, 7(2–4).  
 LDTNLR test, 7(4).  
 nighttime IR data, 7(5).  
 thermal IR channels, 7(1).

azimuth:

angles, 39(Tables 28–29 p. 60).  
 angles at equinox, 2(2, 10, 16).  
 angles at solstice, 2(Fig. 5 p. 7, 10, 16).  
 satellite angle, 13(46); 38(Fig. 37b p. 54).  
 solar angle, 2(2, 16); 7(1); 13(Table 11 p. 29, 46).  
 spacecraft angle, 2(2, Fig. 6 p. 8, 16); 13(Table 11 p. 29).  
 relative angle, 2(2, Fig. 7 p. 9, 10, Fig. 10 p. 13, 16).

## – B –

band-7 radiance, 27(ch. 2).

theory, 27(16–19).

BAOPW, *see* bio-optical, Algorithm Workshop.

baselines, 8(6–13).

algorithms, 8(6–7).  
 ancillary data, 8(7).  
 data archive and delivery, 8(9–10).  
 data for bio-optical algorithms, 8(10).  
 data for vicarious calibration, 8(10–11).  
 data processing and software, 8(8–9).  
 data products, 8(12–13).  
 data quality and acceptance, 8(7–8).  
 detector failure contingency, 8(11).  
 equator crossing contingency, 8(12).  
 ground station support, 8(11).  
*in situ* data policy, 8(13).  
 launch slip contingency, 8(11).  
 level-2 masks and flags, 18(Table 9 p. 18).  
 level-2 products, 18(Table 7 p. 17).

baselines *cont.*

level-3 binned products, 18(Table 8 p. 17).  
 level-3 binning, 8(8, 16).  
 loss of tilt contingency, 8(11).  
 navigation accuracy contingency, 8(11).  
 optical protocols, 8(12).  
 orbit contingency, 8(12).  
 orbital altitude contingency, 8(11).  
 power limitation contingency, 8(11).  
 products, 3(27–28); 5(1).  
 real-time data access, 8(12).  
 recommendations, 8(13–19).  
 revised product list, 18(16–18).  
*see also* data.

basin-scale processes, 1(4, 6–7).

BBOP data processing, 26(ch. 2).

filters, 26(39–41, Fig. 28 p. 40).

LCD file format, 26(38–39, Fig. 27 p. 39).

philosophy, 26(38).

steps, 26(41–43, Fig. 30 p. 42).

biogeochemical, 1(2, 19); 8(1); 25(9–11).

cycles, 1(1, 2); 8(1, 25, 40); 42(16–17).

properties, 5(6–7).  
*see also* AMT, biogeochemical measurements.

*see also* Science Team Meeting, Abstracts.

bio-optical:

algorithm working group members, 8(Table 1 p. 14); 12(Table 1 p. 3, 3); 18(Table 1 p. 3, Table 5 p. 12, Table 6 p. 14); 24(Table 1 p. 2); 36(Table 1 p. 4, Table 2 p. 6).

Algorithm Workshop, 12(3–5, 6–8); 18(3–7, 10, 12–16); 24(3–5); 36(3–12).

algorithms, 1(19); 3(1–2, 6, 8, 11–12, 13, 16, 23, 28–29, Fig. 20 p. 29, 29, 30–31, 32, Fig. 22 p. 33, 34); 4(3); Vol. 5; 8(6, 10); 13(27); 25(4–5, Table 1 p. 8).

data 12(Table 2 p. 4).

data bank, 33(13).

data set, 3(8, 13, 16, 29, 30); 18(4, Table 2 p. 5).

data system 20(ch. 2).

models, 29(9–12, Tables 7–9 p. 12, Tables 18–19 p. 22, 29–30).

processing, 26(ch. 4).

requirements, 5(3, 8); 25(ch. 1).

sampling protocols, 18(8–9); 25(43–47).

*see also* algorithm.

*see also* algorithm, bio-optical.

*see also* algorithm development.

*see also* AMT, bio-optical measurements.

*see also* BBOP data processing.

*see also* bio-optical processing.

*see also* data processing.

bio-optical processing, 26(ch. 4).

data files, 26(Figs. 31–32 pp. 50–51, 52).

instrumentation, 26(49–50).

log files, 26(Fig. 33 p. 52).

*see also* BBOP data processing.

bio-optics, 1(3, 5, 7, 19); 8(10).

algorithm, 13(1, ch. 1, 27).

bio-optics *cont.*

Antarctic, from Sterna-92, 33(25–28, Figs. 13–14 pp. 26–27, Table 3 p. 28).  
blackbody temperature, 40(11, 40, Table 26 p. 49).  
GSFC sphere, 39(ch. 1).

SeaWiFS bands, 39(ch. 2, 50–51, Fig. 25 p. 52, 53).  
bright target recovery, 15(Fig. 8 p. 15); 31(4–5, Tables 1–2 pp. 4–5).  
Brouwer-Lyddane model, 11(2–5, Figs. 5–8 pp. 8–9, 11, Fig. 13 p. 12, 15–16); 15(2–3).  
*see also* models.

buoy:  
drifting optical, 25(12).  
*see also* MOBY.  
*see also* optical buoy.  
*see also* optical mooring.  
*see also* PlyMBODy.

— C —

calibration, 5(2); 10(Tables 1–2 p. 4, Fig. 3 p. 6, Fig. 20 p. 23, Fig. 21 p. 24); Vol. 14; Vol. 16.  
background on, 10(2–3).  
equations, 23(8–14, 18).  
evaluation, 38(14).  
experiment, 19(Fig. 14 p. 29; Table 16 p. 30; Figs. 15–17 pp. 31–32).  
GSFC sphere, 41(ch. 1).  
initialization, 5(4–6).  
*in situ* instruments, 14(2); 25(48–54).  
lunar, 1(11, 18); 3(Fig. 15 p. 22); 10(1–3, 7, 10, Table 3 p. 10, Fig. 9 p. 11, Figs. 12–15 pp. 14–17, Tables 4–5 p. 19, Fig. 16 p. 20, Fig. 19 p. 22, 25); 15(Fig. 2 p. 5, Table 5 p. 7, Figs. 22–23 pp. 34–35); 38(11–12, Fig. 6 p. 13).  
onboard, 3(21); 5(2–3); 10(1–2).  
pigment, 5(24); 25(30).  
preflight solar-based, 19(ch. 3).  
quality control, 10(25).  
round-robin, 8(4, 17, Table 4 p. 21); Vol. 14; Vol. 16; 18(3, 9, 13–14, 15); Vol. 34; Vol. 37.  
sensor, 1(11); 5(2–3); 17(2, 3); 25(4); 38(Fig. 5 p. 13, Fig. 11 p. 16).  
solar, 1(11, 18); 3(24); 10(1–7, Fig. 2 p. 5, Fig. 4 p. 6, Figs. 5–8 pp. 8–9, Figs. 10–11 pp. 12–13, 18); 15(Fig. 3 p. 6, Table 5 p. 7, Fig. 20 p. 32); 38(12).  
solar diffuser, 10(3–5, 7); 23(10).  
spectral, 5(24); 25(22, 30).  
sphere test, 14(Fig. B2 p. 48, Table B2 p. 49).  
subgroup meeting, 18(11).  
sun photometers, 5(24); 25(38).  
system test, 14(Fig. B1 p. 48).  
temperature, 40(ch. 6).  
topics, Vol. 39; Vol. 40.  
trend analysis, 10(25).  
verification, 38(ch. 2, Table 1 p. 17).  
vicarious, 5(2–4); 8(10–11); 25(5–6, 47); 38(Fig. 4 p. 11, 12, 14).  
working group members, 8(Table 1 p. 14).  
*see also* calibration and validation.

calibration *cont.*

*see also* round-robin.  
*see also* SeaStar.  
*see also* SIRREX.  
*see also* sphere.  
calibration and validation, 1(3, 8, 14, 18–22); Vol. 3; 17(3, 5–6, 10–14, 15–17).  
baselines, 3(17); 8(3).  
case studies, Vol. 13; Vol. 19; Vol. 27; Vol. 41.  
cruises, 17(15–17).  
element, 13(35); 18(4–5); 19(41); 38(Fig. 1 p. 2, 37).  
field deployment, 8(17, Table 2 p. 18, Table 4 p. 20); 18(Fig. 1 p. 6).  
on-board, 3(21–23).  
post-launch, 3(23–27).  
prelaunch program, 3(17–21).  
program milestones, 3(Fig. 12 p. 14).  
program schematic, 3(Fig. 11 p. 14).  
quality control procedures, 3(8, 35); Vol. 38.  
team (CVT), 13(1).  
*see also* baselines.  
*see also* calibration.  
*see also* CVT.  
*see also* initialization.  
*see also* round-robin.  
CDF, 13(35, Table 14 p. 36); 19(ch. 5).  
center wavelength, 5(10, 14, 17); 9(Table 1 p. 2); 19(34); 22(8, 10, Table 8 p. 10); 23(25, 29, 30, 33, 42, Table 12 p. 43, Tables 13–14 pp. 52–53); 24(3–4); 25(13–14, 17, 21–22); 33(4, 8); 35(Table 3 p. 7, Tables 8–10 p. 25); 39(Table 1 p. 8, Table 6 p. 19, Fig. 10 p. 20, 40, 42–43, Tables 18–19 p. 43, 45–48, ch. 4); 40(ch. 2, ch. 4, ch. 5).  
characterization:  
collector cosine response, 5(18–19); 25(22–24).  
GSFC sphere, 41(ch. 1).  
immersion factors, 5(19–20); 25(24).  
linearity and electronic uncertainty, 5(20); 25(25).  
pressure effects, 5(21); 25(26).  
pressure transducer, 5(21); 25(26).  
radiance field-of-view, 5(18); 25(22).  
radiometric, 5(15–17); 25(20–26).  
sensor, 25(ch. 4).  
spectral, 5(17); 25(21–22).  
spectral bandpass, 5(15); 25(21–22).  
temperature, 5(20–21); 25(25–26).  
temporal response, 5(17); 25(22).  
*see also* SeaWiFS instrument.  
*see also* spectral characterization.  
chlorophyll, 42(ch. 1).  
concentration, 1(4–5, 15); 3(27, 34); 4(2); 7(1); 8(14, 24, 30, 36); 9(1, 3, 9); 14(1); 15(7); 17(2, 5); 19(Fig. 7 p. 17, Fig. 11 p. 20); 32(Plates 1–3); 42(Fig. 2 p. 5, 20–22).  
measurements, 32(Figs. 1–2 pp. 4–5).  
*see also* MARAS.  
climatology generation, 13(40–41).  
cloud detection, 7(1, 5); 28(ch. 2).  
MODIS, 7(1).

cloud detection *cont.*

*see also* MODIS-N.

cloud screening, Vol. 7.

determining thresholds, 7(2–3).

direct thresholds, 7(1–4).

evaluating methods, 7(5–6).

more complex methods, 7(4–5).

spatial coherence, 7(3–4).

*see also* AVHRR GAC data.

COADS:

data, 13(Plates 16–18).

time series, 13(36–40).

COAST Project, 33(28–33).

concept, 33(Fig. 16 p. 28).

GUI, 33(Fig. 17 p. 28).

overview, 33(28).

software development 33(30).

surface SPM, 33(30–33, Figs. 17–18 pp. 31–32).

Coastal Earth Observation Application for Sediment Transport,  
*see* COAST Project.

Coastal Zone Color Scanner, *see* CZCS.

coccolithophore blooms, 18(4, Table 9 p. 18); 24(4); 28(ch. 3  
and Plate 6).

command:

schedules, 15(3–7, Table 3 p. 4, Table 4 p. 6).

sequence, 15(Tables 7–8 p. 11).

commercial applications, 1(7).

Common Data Format, *see* CDF.

Comprehensive Ocean-Atmosphere Data Set, *see* COADS.

contingencies:

detector failure, 8(11).

equator crossing, 8(12).

launch slip, 8(11).

loss of tilt, 8(11).

navigation accuracy, 8(11).

orbit, 8(12).

orbital altitude, 8(11).

power limitation, 8(11).

correction scheme:

out-of-band, 23(18); 28(ch. 4, Table A2 p. 34); 39(34–37, Ta-  
ble 16 p. 37); 40(16, Table 10 p. 22, 22); 41(ch. 3).

correction study:

pressure and oxygen, 13(ch. 4).

cross-track, *see* propagation model.

cross-track scan, *see* SeaWiFS instrument.

cruise report, Vol. 35.

cruise synopsis, 35(49, 51–59).

at-sea calibrations, 35(51, Fig. 32 p. 52).

transect overview, 35(51, Figs. 33–35 pp. 53–56, 57–59).

cruise track, 35(16–18, Tables 6–7 pp. 16–17, Figs. 5–8 pp. 19–  
22).

cumulative:

glossary, 6(3–5); 12(14–17); 18(29–33); 24(14–18); 30(14–  
18); 36(17–28); 43(33–39).

index entries, 6(1–3); 12(9–13); 18(23–28); 24(6–13); 30(5–  
13); 36(13–22); 43(21–32).

cumulative *cont.*

indexes, Vol. 6; Vol. 12; Vol. 18; Vol. 24; Vol. 30; Vol. 36;  
Vol. 43.

references, 6(5–9); 12(21–28); 18(38–46); 24(24–34); 30(27–  
40); 36(37–53); 43(48–66).

symbols, 6(5); 12(18–20); 18(34–37); 24(19–23); 30(19–26);  
36(29–36); 43(40–47).

CVT, 13(1).

CZCS, 1(1, 5, 6–7, 19); 3(1).

algorithms, 3(1–11, 23); 13(ch. 1); 19(ch. 1).

application of data, 9(7–9).

calibration and validation, 17(10–11).

channels, 7(1, 5).

data collection, 3(6, Fig. 5 p. 5, 21, 30), 7(1).

global sampling, 3(Fig. 9 p. 10).

imagery, 28(ch. 2, and Plates 1–6); 32(Plates 1–3).

level-2 processing parameters, 4(Table 2 p. 2).

level-2 products, 4(1).

modeling compared to SeaWiFS, 3(Fig. 4 p. 5).

orbit, 3(2).

orbital characteristics, 9(Table 2 p. 3).

overlapping scenes study, 13(ch. 5).

parameters and characteristics, 1(Table 2 p. 5), 3(Table 1  
p. 1).

pigment algorithm, 13(Tables 12–13 p. 31); 24(3); Vol. 29.

pigment concentration, 1(5–6); 3(1–2, 8, 27); 13(1, 2, ch. 1,  
Figs. 1–5 pp. 5–8, 9, Figs. 8–9 p. 11, 15, Figs. 14–16 pp. 17–  
18, 22, Figs. 18–19 p. 26, Fig. 20 p. 28, Table 10 p. 29, ch. 6,  
Table 18 p. 45, and Plates: 1–14, and 19–20); 17(6–7).

quality control, 3(Fig. 7 p. 8, Fig. 8 p. 9, 32, 35).

ringing mask comparison, 13(2, ch. 8, and Plate 19).

sensor, 1(5); 3(8).

sensor degradation, 3(23).

time of launch, 2(1).

vicarious calibration, 3(Fig. 6 p. 7, 11, 23, 24–27); 5(3–4).

*see also* bio-optical, algorithms.

*see also* NET.

*see also* ocean color, imagery.

– D –

dark level, *see* SeaWiFS instrument.

DARR-94, 24(3); Vol. 26.

contributors, 26(Table 1 p. 5).

data analysis methods, 26(6–7).

data and results, 26(7–34, Tables 2–3 p. 7).

estimated data, 26(Figs. 11–17 pp. 18–24, Tables 4–5 p. 25).

ocean optics, 26(ch. 1).

raw data, 26(Figs. 1–10 pp. 9–17).

vertical profiles, 26(Figs. 18–26 pp. 26–34).

data:

access of, 8(12); 17(17).

acquisition, 19(21–22); 33(11–12).

airborne simulation, 33(4–11, Fig. 1 p. 5, Figs. 2–3 p. 7, Figs.  
4–7 pp. 9–10, Table 2 p. 11).

ancillary, 1(3, 8, 14, 15); 3(24, 35); 5(3–4); 7(5); 8(3, 7,  
9, 19, 32, 46–47); 13(2, Fig. 23 p. 36); 15(Table 9 p. 11);  
18(Table 9 p. 18); 19(ch. 6, ch. 7); 28(5); 38(ch. 3, Fig. 27  
p. 38).

**data cont.**

archive and delivery, 5(2); 8(9–10).  
 archiving strategy, 38(17, Table 2 p. 17, Table 3 p. 19).  
 binned, gridding scheme, 32(63–64).  
 collection, 3(24); 8(4).  
 day, *see* data day.  
 distribution, 1(16); 8(2, 4, 16, 17).  
 format, 3(32); 8(43–44); 12(5); 15(16–20, Fig. 9 p. 17); 19(ch. 5).  
 interpolation, 13(22).  
 management, 1(3, 11–18); 3(32).  
 policy, 3(37–38); 8(13, Table 4 p. 21, 41–42).  
 processing, 1(3, Fig. 2 p. 4, 11–16, Fig. 10 p. 20, 22); 3(13, 32); 7(5); 8(4, 8–9); 13(16, 21, 35); 17(3); 20(17–18); 26(ch. 4); 33(11–12); 38(4–6, Fig. 7 p. 15, Figs. 12–14 p. 18, 20, ch. 4).  
 processing, SIO method, 26(ch. 5).  
 processing, solar, 38(Fig. 7 p. 15).  
 products, 4(20); 8(8, 12–13, 15–17, Table 4 pp. 20–21, 42–43); 15(2); Vol. 32.  
 quality and acceptance, 8(7–8).  
 requirements, 5(4–6); 25(ch. 2).  
 scheme for weighting, 32(64–65).  
 standard format, 19(ch. 5).  
 strawman, 33(13).  
 subsampling, 4(1).  
 system, 17(3–4, 12–14); 20(ch. 2).  
 using SEAPAK with, 4(1–2).  
*see also* ancillary, data.  
*see also* BBOP data processing.  
*see also* data requirements.  
*see also* data sets.  
*see also* LOIS.  
 data analysis methods, *see* DARR-94, data analysis methods.  
 Data Analysis Round-Robin, Vol. 26.  
*see also* DARR-94.  
 data day, 27(ch. 5).  
 spatial definition, 27(35–41, Figs. 21–22 p. 37, Table 19 p. 38, Figs. 23–25 pp. 39–41).  
 temporal definition, 27(34–35, Figs. 19–20 pp. 35–36).  
 data requirements, 25(ch. 2).  
 above-water techniques, 25(11).  
 ancillary measurements, 25(11).  
 biogeochemical data, 25(9–11).  
 definitions, 25(7–9, Table 1 p. 8).  
 optical buoys, drifting, 25(12).  
 optical moorings, 25(11–12).  
 data sets, 1(3); 5(3–4, 6, 8, 14, 33, 34, 35); 8(23, 33); Vol. 9; Vol. 15; 17(2, 5).  
 animation of, 13(41–42).  
 atmospheric conditions, 9(6–7).  
 atmospheric contributions, 9(4–6).  
 availability of, 9(9–13); 15(40).  
 code for simulating, 9(13–15).  
 currently held, 20(Table 2 p. 10).  
 external, 15(Table 9 p. 11).  
 gridded wind, 19(ch. 8).  
 meteorological, 13(35, Table 14 p. 36); 19(43, 47).  
 meteorological animation, 13(41–42).  
 methods for simulating, 9(2–7).  
 normalized water-leaving radiances, 9(2–3).

**data sets cont.**

orbit model, 9(3–4).  
 ozone, 13(35, Fig. 31 p. 42); 19(43, 47).  
 ozone animation, 13(41–42).  
 simulated total radiances, 9(Figs. 2–4 pp. 10–12).  
 start and stop times, 9(Table 6 p. 9).  
 ten-bit words and data structures, 9(7).  
 viewing and solar geometries, 9(4–6).  
*see also* bio-optical.  
*see also* SIRREX.  
*see also* storage.  
 derived product validation, 1(19, Table 3 p. 21); 13(27, 29, 43).  
 databases, 38(59).  
 matchup evaluation, 38(48–59).  
 matchup methodology, 38(42–48).  
 software, 38(ch. 5).  
*see also* software, derived product validation.  
 descending node, Vol. 2.  
*see also* ascending node.  
 detector failure contingency, *see* contingencies.  
 diffuse attenuation coefficient, 1(7, 15); 3(2); 12(3, 4); 18(7, 9, 13, 14–15, Tables 7–8 p. 17); 21(1, 2, 7, 8, 11, 19); 24(3); 25(7); 26(5, 6–7, 36, 42, 52, 53); 27(Fig. 15 p. 30, Fig. 17 p. 32); 28(5, 7); 32(1, 2, 6–8, 11, Fig. 11 p. 23, 29, Table 2b p. 31, Figs. 15–16 pp. 36–37, 38, 40, Figs. 20–25 pp. 43–48, Fig. 29 p. 56); 33(25); 35(Tables 8–10 p. 25).  
 prelaunch algorithm, 41(ch. 2).  
 diffuse transmittance, *see* atmospheric transmittance.

## — E —

empirical basis, 32(10–29, Figs. 3–14 pp. 13–28, 29–62).  
 engineering data, 8(7–8); 38(ch. 1).  
 EOS-Color, 17(3, 9–10, 11, 13–17).  
 EOSDIS, 17(3, 13, 17).  
 equator crossing time, 2(10, 16); 9(Tables 6–7 p. 9).  
 contingency, 8(12).  
 equinox:  
*see* azimuth.  
*see* sun glint.  
*see* zenith.  
 errata, 12(2); 18(2–3); 24(2); 30(2–4); 36(3); 43(3–4).  
 Executive Council, *see* SeaWiFS Science Team Meeting (Second).

## — F —

field deployment, *see* calibration and validation.  
 field-of-view, *see* SeaWiFS instrument.  
 field program, 18(5, 15); 24(4).  
 computing network, 3(Fig. 21 p. 31).  
 instrumentation, 3(34–35).  
 filter radiometer, 14(Table B9 p. 56).  
 flags, 18(4–5); 38(27–33).  
 algorithm, 8(3, 4, 17); 28(ch. 1).  
 level-2, 18(Table 9 p. 18).  
 level-2 processing, 8(7); 12(4, Table 3 p. 4); 38(28, Fig. 20 p. 29, Figs. 22–23 pp. 31–32, 33).  
 format:  
 conventions, 20(4–5).  
 standard data, 8(15); 19(ch. 5).  
 fractional transmittance, *see* atmospheric transmittance.

- G -

GAC, 1(3, 16); 15(4); 17(5, 12); 31(2).  
 algorithms, Vol. 4.  
 AVHRR data, 7(3).  
 correction, 31(69–71, Table 15 p. 71; 41(Fig. 11 p. 26, Fig. 12 p. 29, Table 11 p. 30, 30).  
 data, 15(2, 21–27, Figs. 11–14 pp. 22–25, and Plates 1–2); 38(4, 6–7, Fig. 18 p. 25, 25, 39–40).  
 generation mechanisms, 4(Table 1 p. 1).  
 generation methods, Vol. 4.  
 resolution, 4(Plates 1–8).  
 sampling techniques, Vol. 4.  
*see also* AVHRR.  
 geometry, 2(1).  
 derived parameters, 2(1).  
 solar, 2(1, 10, 16).  
 sun glint, 2(1).  
 viewing, 2(1, 10, 16).  
*see also* azimuth.  
*see also* zenith.  
 glint correction, 3(23); 8(17); 19(ch. 1, Fig. 1 p. 11).  
*see also* sun glint.

global:

area coverage, *see* GAC.  
 fields, 27(ch. 5).  
 scale processes, 1(6–7).

glossary:

cumulative, 6(3–5); 12(14–17); 18(29–33); 24(14–18); 30 (14–18); 36(17–28); 43(33–39).

ground:

coverage, 2(2, Fig. 1 p. 3).  
 station support, 8(11).  
 systems and support, 1(14–15).  
 GSFC sphere:  
 aperture uniformity, 41(4–11).  
 calibration and characterization, 41(ch. 1).  
 spectral radiance, 41(11–17).

- H -

HDF, 8(7, 8, 9, 10, 11, 15); 13(ch. 7); 19(ch. 5).  
*Hierarchical Data Format, see* HDF.

HRPT:

data, 1(14, 19); 8(8–9, 19); 15(2, 4, 27, Figs. 24–27 pp. 36–39, and Plates 4–6).  
 policies, 8(17, Table 4 p. 20).

hydrography, *see* AMT, hydrography.

- I -

ice detection, 28(ch. 2).  
 immersion coefficients, 18(13); 27(ch. 1).  
 linear regression fits, 27(Tables 9–10 p. 15).  
 MERs, 24(3); 27(Tables 1–8 pp. 4–6, Figs. 1–8 pp. 7–14).  
 in-band response:  
*see* center wavelength.  
*see* spectral radiance.  
*see* spectral response.  
*see* top of the atmosphere, radiance spectrum.  
 index volumes, Vol. 6; Vol. 12; Vol. 18; Vol. 24; Vol. 30; Vol. 36; Vol. 43.  
 index entries:  
 keywords, 6(1–3); 12(9–13); 18(23–28); 24(6–13); 30(5–13); 36(13–22); 43(21–32).  
 infrared radiometers, 7(1).

initialization, 5(4–6, Table 1 p. 5).  
 sampling, 5(31–32).

instrumentation at AMT, 35(3–16).

bridge logs, 35(16, 64, Tables G1–H1 pp. 69–76).  
 circulation and backscatter, 35(15).

CTD, 35(6).

dissolved gases, 35(16).

fluorometry, 35(10–12).

FRRF, 35(12, Table K1 pp. 80–82).

inorganic nutrients, 35(15, Table L1 p. 82).

optics, 35(6–10).

ORKA, 35(6–7).

photosynthesis and calcification, 35(12–13).

pigment extractions, 35(13–14).

sampling, 35(3).

size-fractionated carbon, 35(14–15, Tables D1–E1 pp. 67–68).

UOR, 35(4–6, Fig. 1 p. 5, Table 2 p. 5, 9, 11, 36, Table I1 p. 76).

XBT, 35(4).

*see also* AMT.

instrument spectral response:

*see* SeaWiFS instrument, spectral response.

*see* spectral response.

intercalibration, Vol. 14; Vol. 16; Vol. 34; Vol. 37.

data archive 14(56–57, Tables C1 and C2 p. 57).

sources, 14(Table 1 p. 4); 16(Table A1 p. 117).

irradiance attenuation profiles, 26(ch. 3).

bin-averaged, 26(46).

deck cell smoothing, 26(45–46).

optical depth, 26(46–48).

- J, K -

joint commercial aspects, 1(8).

- K -

*K*<sub>490</sub>, *see* diffuse attenuation coefficient.

- L -

LAC, 1(3); 31(2).

correction, 31(48, 65, Figs. 51–52 pp. 66–67, 68–69); 41(24–28).

data, 1(8, 11); 15(2, 4, 27, Figs. 16–19 pp. 28–31, and Plate 3); 38(4, 6–7, 10, 25, 40).

lamps, Vol. 14; Vol. 16; Vol. 34; Vol. 37.

apparent drift, 14(Fig. 6 p. 13).

calibration setup, 14(Fig. B7 p. 53); 37(24–29).

GSFC reference, 14(Table 3 p. 12).

irradiance, 14(Fig. B4 p. 50, Table B5 p. 52, Fig. B8 p. 53, Table B7 p. 55); 34(Table 1 p. 4, 5); 37(32, 37–38, 46–47, 52).

operating currents, 14(Table 8 p. 28).

slit-scattering function, 37(29, Figs. 14–15 pp. 30–31, 32, Figs. 16–19 pp. 33–36).

standards, 14(2, 4–5); 16(3–23); 34(2–28).

*see also* calibration.

*see also* spectral irradiance.

*see also* spectral radiance.

*see also* sphere.

*see also* transfer.

Land-Ocean Interaction Study, *see* LOIS.

level-2 processing algorithm, 28(ch. 5).

sensor calibration table, 28(31–32, Fig. 11 p. 32).

- level-2 processing algorithm *cont.*  
*see also* algorithm, level-2 processing.
- level-3 data products, Vol. 32.  
**binned**, 8(8, 12); 18(Table 8 p. 17); Vol. 32.
- LOIS:  
airborne campaign, 33(36–37).  
ARS, 33(33–34, Table 4 p. 34).  
data acquisition, 33(37–38).  
data analysis, 33(38–43).  
data system, integrated, 33(37).  
overview, 33(35–36).  
remote sensing, 33(34–44).  
look-up tables, 8(4); 19(5–9).  
LOWTRAN, 40(ch. 1, 23, 34).  
lunar observations, Vol. 10.  
lunar reflectance, 3(23); 10(2–3, 7–25); 19(ch. 2); 23(9).
- M –
- MARAS, 33(23, 25).  
chlorophyll *a* concentration estimating, 33(23–25, Fig. 12 p. 24).  
marine environmental radiometer, *see* MER.  
marine optical buoy:  
*see* MOBY.  
*see* optical buoy.  
Marine Radiometric Spectrometer, *see* MARAS.  
mask, 18(4–5); 38(27).  
algorithm, 8(3, 4, 17); 28(ch. 1).  
level-2, 18(Table 9 p. 18).  
level-2 processing, 3(6); 8(7); 12(4, Table 3 p. 4).  
Miami edge, 13(29).  
*see also* sun glint.  
measurement protocols, 5(26–33); 25(ch. 5).  
meeting agenda, *see* Science Team Meeting.  
MER, 24(3); 27(ch. 1).  
mesoscale processes, 1(6).  
Miami edge mask, 13(29).  
mission:  
operations, 1(14–18); 11(1–2, 15).  
overlap, 17(12).  
overview, Vol. 1; 8(1).  
MOBY, 1(3); 8(3, 4); 38(12, Fig. 8 p. 15, Fig. 11 p. 16).  
calibration, 34(71–75).  
review attendees, 18(Table 4 p. 10).  
review summary, 18(9–11).  
system schematic, 3(Fig. 17 p. 25).  
*see also* optical buoy.  
*see also* optical mooring.  
modeling, 10(1, 10, 18, 25).  
models:  
aerosol, 8(17); 19(5–7, Tables 1–2 p. 6, Fig. 6 p. 17).  
chlorophyll concentration, 19(Fig. 7 p. 17, Fig. 11 p. 20); 42(19–21).  
instrument, 39(39–40).  
orbital prediction, 1(17).  
*see also* Brouwer-Lyddane models.  
*see also* modeling.  
*see also* perturbation models.  
*see also* propagation models.  
MODIS or MODIS-N, 1(19); 17(3, 5, 6–7, 8, 11, 13–15); 42(15–17).  
ATBD No. 25, 42(15).  
instrument characteristics, 3(Table 4 p. 12).
- MODIS or MODIS-N *cont.*  
instrument team, 42(15).  
presentations, 8(3–5).  
MODTRAN7, 40(ch. 1, ch. 3).  
modulation transfer function, *see* SeaWiFS instrument, MTF.  
monochromators, 37(5–6).
- N –
- navigation, 8(11); 9(4); 11(2); 15(3).  
of pixels, 9(4).  
NET, 3(2, Figs. 1–3 pp. 2–4, 23, 27, 28, 29–30); 8(16); 12(4); Vol. 21.  
areas of responsibility, 21(2–3).  
atmospheric correction algorithm, 21(19–20).  
chronology of events, 21(3–11).  
pigment algorithm, 3(Fig. 3 p. 3, Fig. 20 p. 29); 29(Tables 10–14 p. 14, Figs. 6–7 pp. 15–16, 18–29, Table 17 p. 22, Table 20 p. 22, Figs. 10–11 pp. 23–24, Tables 21–26 p. 26).  
research methods, 21(11, 16, 19).  
sea-truth program, 21(11, Fig. 1 p. 12, Tables 2–6 pp. 13–14, Figs. 2–6 pp. 15–18).  
team members, 21(Table 1 p. 3).  
netCDF, 19(ch. 5).  
NIMBUS Experiment Team, *see* NET.  
non-research uses, 1(7–8).  
normalized angular response, *see* angular response.  
normalized water-leaving radiances, 1(15); 3(2, 6, 24, 28–29, 37–38); 4(1–3, 20); 5(1, 3–4, 6, 8, 13, 31–32, 37–38); 8(16, 42); 9(2–3).
- O –
- ocean color, 1(1–4, 8, 10); 8(1–3, 22–43); 13(1, ch. 4); Vol. 17; 33(23–25, Figs. 11–12 p. 24); 42(2, 6, 9, 11, 16–17, 19, 24–25).  
future missions, 3(Fig. 10 p. 12).  
imagery, Vol. 17; 21(5, 6, 10, 11); 28(ch. 3, and Plates 1–6).  
projects, 33(22–23).  
requirements, 1(2).  
*see also* algorithm development.  
*see also* CZCS, pigment concentration.  
ocean model validation:  
biological, 33(13–16).  
ocean optics protocols, Vol. 5; 8(12, 14–15, Table 4 p. 20); Vol. 25.  
*see also* Protocols Workshop.  
Ocean Primary Productivity Working Group, 42(ch. 2).  
goals of, 42(10–12).  
participants, 42(26–28).  
recommendations from, 42(14, 15).  
OCTS, 1(2); 3(11); 17(4, 10, 13, 17).  
instrument characteristics, 3(Table 3 p. 11).  
operational applications, 1(7–8).  
OPPWG, *see* Ocean Primary Productivity Working Group.  
optical buoy, 3(Fig. 17 p. 25).  
drifting, 5(9, 31); 25(12, 43).  
mooring, 3(Fig. 18 p. 26); 5(8, 30–31); 25(11–12).  
prototype, 5(30–31); 25(42–43).  
*see also* MOBY.  
*see also* PlyMBODY.  
optical instruments, Vol. 5; 10(Figs. 17–19 pp. 21–22); Vol. 25.  
optical measurements, Vol. 5; Vol. 25.  
accuracy specifications, 5(9–15).  
analysis methods, 5(33–39).

- optical measurements *cont.*  
 science community, role of, 5(3); 25(5).  
 sensor characterization, 5(Tables 2–4 pp. 10–11, 15–25).  
*see also* MOBY.  
*see also* optical buoy.
- optical oceanography, 33(25).
- optical thickness, 8(17); 19(5, 7, Tables 3–4 p. 7, Tables 8–11 p. 10).  
 Rayleigh, 3(34); 9(4–6, Table 4 p. 5); 13(ch. 3, ch. 4).
- orbit, 3(23).  
 characteristics, 9(Table 2 p. 3).  
 contingency, 8(12).  
 distribution of local time, 2(Fig. 2 p. 4).  
 downlink, 15(4, Table 3 p. 4).  
 parameters, 1(18); 2(2).  
 propagation, 15(3, Table 3 p. 3).  
*see also* propagation model.
- orbital:  
 altitude contingency, 8(11).  
 characteristics, 9(1, Table 3 p. 3); 15(Table 1b p. 3).  
 elements, 11(2).
- out-of-band correction algorithm, 23(18, 42–43).
- out-of-band response:  
*see* center wavelength.  
*see* spectral radiance.  
*see* spectral response.  
*see top of the atmosphere, radiance spectrum.*
- overview, Vol. 1.  
*see also* index.
- oxygen A-band, *see* oxygen absorption band or band-7 radiance.
- oxygen A-band absorption, *see* oxygen absorption band.
- oxygen absorption band, 13(16, 19, Fig. 17 p. 19); 27(ch. 2, Figs. 9–10 pp. 17–18, Tables 12–13 p. 19); 39(Fig. 1 p. 3, 34–35, 37–38); 40(Figs. 2–3 pp. 6–7, 8, Fig. 5 p. 10, 11, 15–16, Fig. 7 p. 17, ch. 3, 49).  
*see also* band-7 radiance.
- ozone:  
 absorption, 13(9, 21); 40(Tables 13–14 pp. 29–30, Table 20 p. 37, 38).  
 bandwidth, 40(23–26, Figs. 10–12 pp. 27–28, Tables 13–14 pp. 29–30).  
 concentration, 8(7); 9(5); 13(9, Figs. 6–7 p. 10, Figs. 11–12 p. 13, 30, and Plate 15); 16(7, 8).  
 control point value, 13(Tables 7–9 pp. 24–25).  
 correction, 13(ch. 4, and Plates 7–13).  
 data analysis, 13(1, ch. 2).  
 images, 13(Plates 7–13).  
 optical thickness, 13(Fig. 10 p. 12).  
*see also* data set, ozone.
- P -
- PACE, 33(20–22, Fig. 10 p. 21).
- perturbations model:  
 general, 11(2–3).  
 special, 11(2).
- photodetector measurements, 14(Table A1 p. 47).
- photosynthesis, 8(24–26, 31–32, 34–35); 35(12–13, 25–26, Fig. 13 p. 29, 39, 43–45, 57); Vol. 42.
- carbon fixation, 42(19).  
 net, 42(29).
- parameterization issues, 42(8–10).
- processes, 42(4–6).
- phytoplankton, 1(1, 4, 6–7); 3(12, 32); 5(6, 7, 8, 15, 24, 32, 37, 38–39); 8(1, 15, 22–41, 47); 9(2–3); 13(30); 17(1–2, 3–9, 14, 16–17); 18(4, 12, 15); 21(8, 10, 19); 25(9–12, 19, 30, 40–42, 43–47, 55, 56, 57–59); 29(1–3, 10, 11, 12, Tables 8–9 p. 12, 20); 32(29); 33(14–15, 16, 22–23, 25, 38); 35(1–3, 9, 10, 12–14, 25–26, Fig. 13 p. 29, 38, 39, 43, Figs. 25–27 pp. 44–45, 46–47, 51, 57–59); Vol. 42.
- concentration of, 42(4–6).  
 definition of, 42(29).  
 diversity of, 42(3–4).
- pigment, 17(7); 25(56); 29(Tables 8–9 p. 12); Vol. 35.
- algorithm, 3(28, 29); 8(24); 28(ch. 3); Vol. 29.
- concentration, 1(Plates 1–5); 3(1, 2, 6, 8, 13, 23, 27, 28, 31–32, 35); 4(Table 1 p. 1, 2, Table 3 p. 3, Figs. 5–11 pp. 6–9, 20, and Plates 1–8); 5(2); 7(1); 8(4, 14, 24, 30, 36, 40); 13(ch. 2, ch. 3); 17(7, 11, 15–16); 25(9–11, 44); 28(Tables 2–3 p. 11, 9–12, and Plates 1–6); Vol. 29; 32(Plates 1–3).
- data, 9(2).
- database, 20(ch. 3).
- data sets, 20(18, Table 5 pp. 20–21, 21).
- mean, 13(Tables 1–2 p. 8).
- ratios, 24(3); 29(Fig. 5 p. 7, Table 3 p. 8).
- regressions, 29(Table 2 p. 3, Fig. 4 p. 6).
- values, 4(Fig. 26 p. 15, Figs. 31–33 pp. 18–19).  
*see also* algorithm, pigment.  
*see also* calibration.  
*see also* chlorophyll.  
*see also* coccolithophore blooms.  
*see also* CZCS, pigment concentration.  
*see also* phytoplantton.
- pixel size, 3(Fig. C1 p. 39).
- Planck function, *see* blackbody temperature.
- plaques, *see* reflectance, plaques.
- PlyMBODY, 33(16–20, Fig. 10 p. 21).  
 design, 33(18, 20).  
 PACE, 33(20–22, Fig. 10 p. 21).  
 program overview, 33(18).  
 project progress, 33(20).
- Plymouth Atmospheric Correction Experiment, *see* PACE.
- Plymouth Marine Bio-Optical Data Buoy, *see* PlyMBODY.
- Prelaunch Science Working Group, *see* SPSWG.
- pressure:  
 surface, *see* surface pressure.
- pressure and oxygen:  
 absorption study, 13(ch. 3).  
 correction study, 13(ch. 4, and Plates: 8, 10, and 12).
- primary productivity, 1(6–7); 3(12–13, 28, 30); 5(6–7, 25, 27); 8(1, 15, 22–41, 45, 47); 17(1–2, 4–5, 7–9, 14–15); 21(4); 25(10–11); 32(1, 2, 7–8, 10); 35(3, 6, 12–14, 36, 43, Fig. 26 p. 45, 46, 49, 51, 57, 59, Table K1 pp. 80–82); Vol. 42.
- algorithm classification, 42(19–21).  
 algorithm parameterization, 42(19, 21–24).  
 algorithm testing, 42(23–24).  
 algorithm theoretical basis document (ATBD No. 25), 42(15).  
 algorithms, Vol. 42.
- classification system for models, 42(Table 2 p. 7).  
 definition of, 42(29).  
 global annual, 42(Table 4 p. 11).  
 model forcing, 42(12–16).  
 model integration levels, 42(9–12).  
 working group, *see* OPPWG.
- working group members, 8(Table 1 p. 14).

proceedings:

- Science Team Meeting, Vol. 8.
  - Science Team Meeting (Second), 43(8–12).
  - SeaWiFS Exploitation Initiative (SEI), Vol. 33.
  - see also* Science Team Meeting.
  - see also* SEI.
  - Project, 1(3); 3(1, 13, 16, 23–24, 32, 34, 38).
  - goals, 1(2–3).
  - objectives, 1(3).
  - organization and personnel, 1(Table 4 p. 22); 3(Fig. 13 p. 15).
  - presentations, 8(3–5).
  - responsibilities, 12(3–4).
  - schematic, 1(Fig. 8 p. 12, Fig. 9 p. 13).
  - structure, 3(13–16).
- propagation model:
- along-track, 11(5, Figs. 1–8 pp. 6–9, Fig. 11 p. 11, Figs. 12–14 pp. 12–13, Fig. 16 p. 14).
  - cross-track, 11(5, Fig. 9 p. 10, Fig. 15 p. 13, Fig. 17 p. 14).
  - orbit, Vol. 11.
  - radial, 11(4, 5, Fig. 10 p. 10).

Protocols:

- ocean optics, Vol. 5; Vol. 25.

Protocols Workshop, (bio-optical algorithm), 12(3, 5–8); 18(3–9, 12–18); 24(2–5); 36(3–12).

attendees addresses, 12(6–8); 18(19–22); 36(6–12).

Subgroup Workshop, 18(3, 7–9, 12–13, 14–16).

team members and guests, 12(Table 1 p. 3); 18(Table 1 p. 3, Table 3 p. 7, Table 5 p. 12, Table 6 p. 14); 18(19–22); 24 (Table 1 p. 2).

*see also* ocean optics.

#### – Q –

quality control, 3(29–30, 35–36); 10(Fig. 20 p. 23); 12(5).

ancillary data, 38(ch. 3, 40–41).

automatic programs, 38(37, 39).

codes, 38(39, Table 4 p. 39).

flags, 8(4); 12(3–4); 28(ch. 1).

level-1 screening, 3(35).

level-1a, 38(ch. 4).

level-2, 3(35); 8(4); 38(ch. 4).

level-2 product screening, 3(35–36).

level-3, 38(ch. 4).

level-3 product screening, 3(36).

masks, 8(4); 12(4); 28(ch. 1).

procedure details, 38(37).

software, 38(6–9, ch. 3, ch. 4).

*see also* bio-optical algorithm workshop.

#### – R –

radial, *see* propagation model.

radiance attenuation profiles, 26(ch. 3).

- bin-averaged, 26(46).
- deck cell smoothing, 26(45–46).
- optical depth, 26(46–48).

radiance measurements, 14(Table 9 pp. 29–30, Table 10 p. 31, Fig. 15 p. 32, Table 11 pp. 33–35, 44); 16(Table 6–7 pp. 37–44); 19(Figs. 2–6 pp. 14–15, 23); 25(34–35, 54–55); 33(16, Fig. 8 p. 17); 34(Fig. B2 p. 72); 37(9–10, Fig. 4 p. 11, 12, Table 2 p. 12, Fig. 8 p. 18, Table 4 p. 22, Fig. 10 p. 23); 39(Figs. 6–9 pp. 12–15, Table 4 p. 16, ch. 2, 39).

calibration factors, 16(Fig. 18 p. 46).

output, 14(Table 12–14 pp. 38–41).

*see also* spectral irradiance.

radiance measurements *cont.*

*see also* spectral radiance.

radiance spectrum:

*see* spectral radiance.

*see* top of the atmosphere, radiance spectrum.

radiometers, 13(16, 19); Vol. 14; Vol. 16; 19(26–27, 30); 20(24, 26–28); 21(1, 4, 10, 11, 16); Vol. 22; Vol. 23; 25(17–29, 33–37, 45, 47, 49, 52–55); Vol. 31; 33(6, 11–12, 20, 22, 25, 30, 33); Vol. 34; Vol. 37.

above water, 5(38); 25(17–18, 28–29).

airborne, 5(7–8, 23–24); 25(33–34).

in-water, 5(10–13); 25(13–16, Tables 2–4 pp. 13–15, 48–54).

moored, 5(38); 25(55).

transfer, 37(50–52).

*see also* filter radiometer.

*see also* SeaWiFS instrument.

radiometric:

calibration, Vol. 23; 25(20–21, Fig. 1 p. 21).

profiles, 5(33–39).

specifications, 3(36–37, Table A1 p. 36); 8(4); 25(ch. 3).

standards, 5(21–23); 25(26–28, Fig. 2 p. 28).

*see also* characterization, radiometric.

*see also* radiometer.

*see also* SeaWiFS instrument.

references:

cumulative, 6(5–9); 12(21–28); 18(38–46); 24(24–34); 30 (27–40); 36(37–53); 43(48–66).

CZCS data, 21(23–41).

reflectance:

gradients, 10(2–3); 19(Tables 6–7 p. 8, 8).

plaque, 5(15–17); 14(5, 31, 41); 16(111); 34(63–67, Fig. 33–34 pp. 65–66, 69); 37(19–24, 41, Fig. 22 p. 42, 47, 53–54, Figs. B1–B2 p. 55).

research:

applications, 1(3–5).

cruises, 3(30–32).

round-robin:

calibration, 8(4, 17, Table 4 p. 21); 12(4).

data analysis, Vol. 26.

intercalibration, Vol. 14; Vol. 16; Vol. 34; Vol. 37.

protocols working group, 8(Table 1 p. 14); 18(Table 3 p. 7).

*see also* calibration, round-robin.

#### – S –

satellite remote sensing, 7(1).

saturation radiances, 3(Tables A2–A4 pp. 36–37); 15 (Table 11 p. 13); 19(Table 5 p. 8).

SBRC database, *see* SIRREX, SBRC database.

scale, Vol. 14; Vol. 16; Vol. 34; Vol. 37.

*see also* transfer.

scanning characteristics, 9(1).

science mission goals, 3(12–13).

Science Team Meeting, Vol. 8.

abstracts, 8(22–41).

agenda, 8(5–6).

attendees, 8(51–59).

executive committee, 8(22).

invited presentations, 8(1–3).

questionnaire, 8(19–22, 44–51).

Science Team Meeting (Second), 43(8–20).

agenda, 43(9).

executive council, 43(9–10).

executive council members, 43(Table 3 p. 11).

- Science Team Meeting (Second) *cont.*  
 objectives, 43(9).  
 participants' addresses, 43(12–20).  
 team members, 43(Table 2 p. 10).  
 working groups, ad hoc, 43(10–12).
- SeaBAM, 43(4–8).  
 action items, 43(7–8).  
 final results and conclusions, 43(7).  
 objectives and approach, 43(6–7).  
 participants, 43(Table 1 p. 6).  
 participants' addresses, 43(12–20).
- SeaBASS, Vol. 20; 33(13).  
 file architecture, 20(ch. 1).
- SEAPAK, 4(1–2, 20).
- SeaStar, 1(1, 3, 8); 2(1–2); 3(21); 10(3,7).  
 launch sequence, 1(Fig. 4 p. 9).  
 operational system, 1(Fig. 6 p. 10).  
 orbital simulation parameters, 2(Table 1 p. 2); 11(Table 1 p. 1).  
 pitch rate, 10(7).  
 satellite, 1(Fig. 5 p. 9).  
 spacecraft description, 1(8–10).
- SeaWiFS Bio-Optical Algorithm Mini-workshop, *see* SeaBAM.
- SeaWiFS Exploitation Initiative, *see* SEI.
- SeaWiFS Exploitation Initiative Bio-optical Archive and Storage System:  
*see* SEIBASS.  
*see* SEI.
- SeaWiFS instrument, 1(1, 5–6, 8, 10–11); 4(1); 5(6, 9–14); 8(7–8, 17).  
 absolute accuracy, 22(19–20).  
 acceptance report, prelaunch, Vol. 22.  
 acceptance testing, 8(4, 13–14, Table 4 p. 20).  
 band co-registration, 22(10–11, Fig. 5 p. 12, Tables 12–13 p. 12).  
 band edge wavelengths, 23(51, Table 13 p. 52).  
 band tolerances, 22(7–8, Tables 5–7 p. 9).  
 bandwidths, 1(Table 1 p. 1, Fig. 2 p. 2, 11).  
 bilinear gains, 23(2, 4, Fig. 4 p. 5, Tables 1–4 p. 6, 6–7, Fig. 5 p. 8, 18); 31(6, Fig. 3 p. 7, Tables 3–6 p. 8, Fig. 4 p. 9).  
 bright target recovery 15(Fig. 8 p. 15); 31(4–5, Tables 1–2, pp. 4–5).  
 calibration and characterization, 3(Fig. 14 p. 18); 8(4); 25(4, ch. 4).  
 calibration constants, 23(17–18, Table 9 p. 19).  
 calibration equations, 23(8–14, 18).  
 characteristics, 2(Table 1 p. 2); 3(Table 2 p. 11, 13).  
 cross-track scan, 22(4, Figs. 3–4 p. 6, 7).  
 dark level, 22(7).  
 description of, 1(10–11); 23(2, Figs. 1–3 pp. 3–4); 31(3–4, Fig. 2 p. 3).  
 dynamic range, 22(14, Tables 16–18 p. 17).  
 electronic recovery tail, 31(6, 9–10, Fig. 5 p. 11).  
 field-of-view, 1(11); 5(1, 10, 12–18, 20–24, 28–29, 31, 38); 22(2, Fig. 1 p. 3, 4, Table 3 p. 4, Fig. 2 p. 5).  
 fore-and-aft pointing, 22(7, Table 4 p. 7).  
 gains, 22(18, Table 21 p. 19); 23(14–17).  
 in-flight data, 22(29).  
 launch time, 2(1).  
 major milestones, 3(Table 7 p. 21); 22(Table 1 p. 2).  
 mirror sides, 23(7–8, Table 5 p. 9).  
 monitoring of, 1(18).  
 MTF, 22(14, Tables 19–20 pp. 18–19).  
 operations schedules, 1(17–18).
- SeaWiFS instrument *cont.*  
 out-of-band response, 22(8, Tables 8–11 pp. 10–11); 23(51, Table 14 p. 53).  
 pointing knowledge, 22(24, 28).  
 polarization, 22(12–14, Table 15 p. 13, Figs. 6–7 pp. 15–16).  
 radiometric calibration, Vol. 23.  
 scanner, 1(11, Fig. 7 p. 14).  
 sensitivities, 1(5, Fig. 3 p. 6); 5(Table 4 p. 11, 14); 22(11–12, Table 14 p. 13).  
 spectral bands, 1(11); 9(1, Table 1 p. 2).  
 spectral characterization, Vol. 23.  
 spectral differences, 22(8, 10).  
 spectral response, 23(21–43); 39(ch. 1, ch. 2, ch. 3, ch. 4).  
 stability and repeatability, 22(28–29).  
 stray light response, 23(2, 13); Vol. 31.  
 system level response, 23(43–51).  
 telemetry parameters, 3(Table 8 p. 23).  
 temperature factors, 23(18–21); 40(ch. 6).  
 testing and design, 22(1–2).  
 test plan summary, 3(Table 6 pp. 19–20).  
 transient response, 22(18–19, Tables 22–23 p. 20).  
 vicarious calibration, 5(3–4, 33).  
*see also* along-scan, correction.  
*see also* optical instruments.  
*see also* radiometer.  
*see also* solar diffuser.  
*see also* specifications.  
*see also* spectral response.  
*see also* stray light.
- SeaWiFS Transfer Radiometer, *see* SXR.
- SEI:  
 abstracts, extended, 33(2–44).  
 agenda, 33(2).  
 attendees, 33(45–47).  
 CASI band set, definition, 33(44).  
 contributors, 33(44–45).
- SEIBASS, 33(13).
- sensor:  
 calibration, 5(2–3); 25(4, ch. 4).  
 characterization, 5(15–25); 9(Table 2 p. 3); 15(13); 25(4, ch. 4); 38(14, Figs. 10–11 p. 16, Fig. 4 p. 11).  
 CZCS, *see* CZCS.  
 monitoring, 1(18).  
 operations schedules, 1(17).  
 radiometry, 25(20–26).  
 ringing, 4(2).  
 ringing mask, 13(2, 27, and Plate 19).  
 saturation response, 15(13, 27–39).  
 SeaWiFS, *see* SeaWiFS instrument.  
 tilt, 15(Fig. 1 p. 5).  
*see also* characterization.  
*see also* CZCS, ring mask comparison.  
*see also* radiometer.  
*see also* SeaWiFS instrument.  
*see also* solar diffuser.  
*see also* specifications.
- ship shadow, 8(14); 27(ch. 4).  
 avoidance, 5(25–26); 25(31–32).  
 downwelling irradiance, 27(27, Figs. 14–17 pp. 29–32).  
 experimental methods, 27(26, Fig. 13 p. 27).  
 remote sensing reflectance, 27(Fig. 18 p. 33).  
 shunts, 16(111–116); 34(67).  
 tests, 14(41–42).  
 SIMBIOS, 42(15).

- SIRREX:**
- database, **20**(ch. 4).
  - SBRC database, **20**(ch. 5).
  - see also* SIRREX-1.
  - see also* SIRREX-2.
  - see also* SIRREX-3.
  - see also* SIRREX-4.
  - SIRREX-1, Vol. 14; **18**(9).
  - attendees, **14**(57–58).
  - equipment and tests, **14**(Table B1 p. 49).
  - participants, **14**(Table 1 p. 4).
  - validation process, **14**(Fig. 1 p. 3).
  - SIRREX-2, Vol. 16; **18**(9).
  - attendees, **16**(116–118).
  - equipment and tests, **16**(Table A1 p. 117).
  - participants, **16**(Table A1 p. 117).
  - SIRREX-3, **18**(9, 13, 16); Vol. 34.
  - attendees, **34**(75–76).
  - equipment and tests, **34**(Table A1 p. 70).
  - participants, **34**(Table A1 p. 70).
  - SIRREX-4, Vol. 37.
  - attendees, **37**(57–60).
  - software:
    - derived product validation, **38**(ch. 5).
    - quality control, **38**(ch. 4).
    - see also* derived product validation.  - solar:
    - calibration, **27**(ch. 3, Tables 14–17 pp. 21–22, Figs. 11–12 p. 23, Table 18 p. 24).
    - diffuser, **3**(11, 13, 21, 23, 24, 38); **5**(2, 17, 19, 22); **8**(13, 36); Vol. 10; **15**(7, Table 8 p. 11, 27, Figs. 20–21 pp. 32–33); **17**(13); **19**(26–32, Figs. 11–12 p. 28); **23**(9–10); **39**(ch. 5).
    - irradiance measurements, **3**(Fig. 16 p. 22).
    - observations, Vol. 10.
    - see also* calibration.
    - solar radiation, **27**(ch. 3).
    - solstice:
      - see* azimuth.
      - see* sun glint.
      - see* zenith.    - specifications, **25**(ch. 3).
    - airborne, **5**(13–14).
    - above-water radiometry, **25**(17–18).
    - atmospheric aerosols, **25**(19).
    - hydrographic profiles, **25**(19, Table 6 p. 19).
    - in-water radiometers, **25**(13–16, Tables 2–4 pp. 13–15).
    - IOP instruments, **5**(14–15); **25**(18–19, Table 5 p. 18).
    - spectral characteristics, **5**(10); **22**(8–10); **25**(13–14, Tables 2–3 pp. 13–14, Table 4 p. 15, Table 5 p. 18).
    - spectral sky radiance, **25**(19).
    - surface irradiance, **5**(13); **25**(17).
    - see also* radiometer.
    - see also* SeaWiFS instrument.
    - spectral absorption, **25**(Table 5 p. 18, 56–59).
    - spectral bands, **1**(1–2); **5**(Table 2 p. 10, 17); **9**(1, Table 1 p. 2); **15**(Table 1a p. 2); **25**(17).
    - spectral characterization, Vol. 23; **25**(21–22).
    - see also* characterization.
    - see also* SeaWiFS instrument.
    - spectral differences, *see* SeaWiFS instrument.
    - spectral irradiance, **5**(13, 16, 25–27); **8**(25); **14**(Figs. 2–5 pp. 8–11, Figs. 7–14 pp. 20–27, Fig. 18 p. 43); **15**(Table 10 p. 11); Vol. 16; **19**(4–5, 7, Table 5 p. 8, 26, 32, 33); **21**(8, 11, 16); **25**(7–11, 17, 20–21, 26–27, 32–35, 38–39, 48–55); **27**(ch. 1;
    - spectral irradiance *cont.*, **34**(2–38, 50–51, 58, 63–65, 67–69, 71–75); **37**(14–15, 38, Figs. 20–21 pp. 39–40, 46–47).
    - and radiance measurements, **3**(2); **5**(13, 16, 21–23, 25–27).
    - calibration geometry, **14**(Fig. B3 p. 50).
    - see also* lamps.
    - spectral radiance, **5**(21–23, 25–27); **8**(25); **14**(29–41, 45–47, Fig. A2 p. 46, 47, 52, 55–56); **15**(Table 11 p. 13); **16**(24, 36, Table 6 pp. 37–42, Fig. 17 p. 45, 47–111, Figs. 19–20 pp. 47–48, Tables 8–10 pp. 49–61, Figs. 22–27 pp. 73–78, Tables 14–17 pp. 79–95, 115–116, 118); **19**(25–26, Table 5 p. 8, Table 5 p. 23, ch. 4); **21**(11, 16); **22**(7, 8, 11, 19, 21, 29); **25**(7–11, 12, 19, 25, 26–27, 31–35, 39, 54–55); **34**(2, 28, 36–64, 68–69, 71–75); **37**(6–19, Figs. 2–3 pp. 7–8, 38, 41, Table 6 p. 43, 44, Fig. 24 p. 45, 45–47, Fig. 26 p. 51, 52); **39**(39, 42, Table 18 p. 43, Table 20 p. 44, Fig. 23 p. 46, 47, Table 24 p. 48, 49–50, Fig. 25 p. 52, Table 26 p. 53); **40**(ch. 1, ch. 2, 26, ch. 4, ch. 5); **41**(11–15, Tables 5–6 pp. 16–17).
    - see also* radiance measurements.
    - spectral reflectance, **5**(37, 38); **8**(27, 29–30, 35, 49); **16**(2–3, Table 20 pp. 112–113, Fig. 31 p. 114); **19**(ch. 2); **25**(35, 53, 55); **33**(25); **37**(19–20).
    - BSI sphere, **16**(62, Fig. 22 p. 73, Table 14 pp. 79–81).
    - CHORS sphere, **16**(62, Figs. 23–27 pp. 74–78, Tables 15–16 pp. 82–90).
    - calibration, **14**(Fig. A1 p. 46).
    - GSFC sphere, **16**(36, Fig. 17 p. 45, Figs. 19–20 pp. 47–48, Tables 8–10 pp. 49–61, Fig. 21 p. 63, Tables 11–13 pp. 64–72, 118–119, Figs. C1 and C2 p. 119).
    - NOAA sphere, **16**(81, Table 19 pp. 106–109, Fig. 30 p. 110).
    - UCSB sphere, **16**(62, 81, Table 17 pp. 91–95, Fig. 28 p. 96).
    - WFF sphere, **16**(81, Table 18 pp. 97–103, Fig. 29 p. 104).
    - see also* sphere sources.
    - spectral response, **14**(31, Fig. A2 p. 46); **15**(13); **23**(21–43); **28**(25); **34**(37, 63, 68); **39**(Figs. 1–2 p. 3, 38, ch. 3); **40**(26, Fig. 13 p. 32, Table 16 p. 33, 34, Table 17 p. 35, 39, Table 24 p. 46, ch. 5).
    - instrument, **22**(8, 10); **23**(1, 21, 23, 25, Fig. 11 p. 27, 29–51); **25**(14, 17, 21); **35**(9); **39**(ch. 1, ch. 2, ch. 3, ch. 4).
    - source, **39**(ch. 1).
    - SXR, **39**(ch. 3, 49, 53).
    - spectral shape, **23**(18); **28**(ch. 4); **31**(14, 16); **39**(ch. 1, ch. 2, 39–40, 42, 53).
    - on-orbit, **39**(33–34).
    - source, **22**(8, 18); **23**(18, 21, 23, 25, 29–30, 42–43, Fig. 25 p. 44, 51); **28**(20, 22, 25); **39**(ch. 2, 39, 40, 49, Table 25 p. 52, 53); **40**(47, ch. 5).
    - sphere, **22**(21); **39**(40, 42, 49, Table 25 p. 52).
    - see also* sphere, spectral shape.
    - sphere, Vol. 14, Vol. 16; Vol. 34; **37**(6–19, 44).
    - calibration setup, **14**(Fig. B5 p. 51, Fig. B9 p. 54).
    - GSFC, **41**(ch. 1).
    - hardware evaluation, **37**(44).
    - integrating, **5**(15); **14**(28–31, 45); **16**(2); **19**(ch. 4); **23**(13); **34**(2–3, 28, 36–38, Fig. 22 p. 49, 47, 50, 63); **37**(5, 6–7, 10, 15, 20–21, 26–27, 29, 32, 37–38, 41, 46, 50, 52, 58); **39**(ch. 1).
    - measurements, **14**(Table B8 p. 55).
    - radiance, **14**(Table B3 p. 49, Fig. B6 p. 51, Table B4 p. 52, Table B6 p. 52); **16**(24, 36, Tables 6–7 pp. 37–44, Fig. 17 p. 45, 47–111, 116); **22**(19); **23**(2, 4, Table 1 p. 6, 33); **34**(11, 36–39, 50, Fig. 26 p. 54, 60, 62–63, 68–69); **37**(9, 12, Fig. 5 p. 13, Fig. 6 p. 14, 14, 52); **39**(39, 40, 47).
    - source comparisons, **14**(42–44).

SeaWiFS Prelaunch Technical Report Series Final Cumulative Index

- sphere *cont.*  
 source, 14(28, 31); 16(23–111); 19(25, 33); 34(28–63); 37(6, 9).  
 spectral shape, 39(40, 42, 49, Table 25 p. 52); 40(40).  
*see also* spectral radiance.  
*see also* spectral reflectance.  
 SPSWG, 1(1); 3(Table 5 p. 16, 27–28).  
 stability tests, 14(42).  
 standard data format, *see* format, standard data.  
 statistics, 32(3–10, Table 1 p. 12, 29).  
 spatial, 32(10, Table 1 p. 12, Figs. 3–4 pp. 13–17, Figs. 5–14 pp. 19–28, Tables 2–3 pp. 30–35, Figs. 15–16 pp. 36–37).  
 temporal, 32(29–62, Table 4 p. 38, Fig. 17 p. 39, Figs. 18–28 pp. 41–48, Table 5 p. 49–52, Figs. 26–31 pp. 53–58, Table 6 p. 59, Table 7 p. 61, Fig. 33 p. 62).  
 storage:  
 data sets, 19(Table 19 p. 44, Figs. 19–20 pp. 44–45, Table 20 p. 48); 20(Table 1 p. 9).  
 stray light, 16(62, 81, 105, 111, 115–116); 18(Table 9 p. 18); 19(26); 22(18–19, 29); 23(2, 13, 21); 25(42–43); 27(20); 28(5); Vol. 31, 34(39, Fig. 18 p. 44, 47, Fig. 22 p. 49, 50, 56, 62–63, 67, 69).  
*assessment*, 31(23, Table 10 p. 28).  
*correction algorithm*, 31(2, 20, 23, 29–71); 41(4).  
*masking*, 41(30).  
*post-modification tests*, 31(16–23, Figs. 11–13 pp. 17–19, Tables 8–9 pp. 21–22, Fig. 14 p. 22, Figs. 15–18 pp. 24–27).  
*proposed modifications*, 31(16, Table 7 p. 16, 71–73).  
*response*, 15(13, Fig. 7 p. 14, 27); 23(2, 13); 28(5).  
*sources*, 31(10–16, Fig. 6 p. 11, Figs. 7–8 p. 13, Figs. 9–10 p. 15).  
*summary*, *see* index.  
 sun glint, 1(18); 2(1, 10, 14); 3(6, 34); 9(2, 4–5, 6, 7, 9); 15(3, 4, 21, 27); 19(Fig. 1 p. 11); 28(5–6, 12).  
 at equinox, 2(10).  
 at solstice, 2(10, 16).  
*flag sensitivity study*, 13(ch. 9, and Plate 20).  
*radiance distribution*, 2(Fig. 8 p. 11, Fig. 11 p. 14).  
 surface pressure, 8(4, 7); 13(Table 3 p. 16, Fig. 13 p. 17, 19–22, Tables 4–6 pp. 23–24, and Plates: 6–7 and 17); 28(11); 40(34).  
 surface wind products, 19(ch. 8).  
 SXR, 39(ch. 3); 40(40, Fig. 14 p. 43).  
*spectral response*, 39(ch. 3, 49, 53).  
*see also* center wavelength.  
*see also* spectral radiance.  
*see also* spectral response.  
 symbols:  
 cumulative, 6(5); 12(18–20); 18(34–37); 24(19–23); 30(19–26); 36(29–36); 43(40–47).  
  
 – T, U –  
 telemetry, 1(10, 14); 8(11); 9(1, 2, 7, Fig. 1 p. 8, 9); 10(1, Figs. 20–21 pp. 23–24, 25); 15(2, 13–20, Figs. 9–10 pp. 17–18, Tables 12–13 pp. 19–20, Table 14 p. 21); 28(Table 2 p. 6).  
 temperature:  
 calibration, 40(ch. 6).  
 correction, 40(Figs. 23–25 pp. 60–61, 61–62).  
 top of the atmosphere, 19(Table 6 p. 8, Table 8 p. 10, Fig. 2 p. 14, Figs. 4–5 p. 15–16, Fig. 9 p. 19, 27); 27(19, 22, 24).  
*radiance spectrum*, 40(ch. 1, ch. 2, ch. 3, 46, Table 26 p. 49, 49, Table 32 p. 54, 55).  
 total band response:  
*see* center wavelength.  
*see* spectral radiance.  
*see* spectral response.  
*see* top of the atmosphere, *radiance spectrum*.  
 transfer, Vol. 14; Vol. 16; Vol. 34; Vol. 37.  
 irradiance scale, 14(Table 2 pp. 6–7, Tables 4–7 pp. 14–19, 28); Vol. 16.  
 methods, 34(37–38).  
*see also* spectral irradiance.  
*see also* spectral radiance.  
  
 – V –  
 validation, 19(9–20).  
 algorithm, 8(16).  
 product, 8(10, 16).  
 sampling, 5(2, 31–33).  
*see also* algorithms.  
*see also* calibration.  
*see also* calibration and validation.  
 viewing and solar geometries, 9(4–6); 13(3, 46); 40(34).  
 visible radiometers, 7(1).  
*see also* AVHRR.  
*see also* CZCS.  
*see also* MODIS.  
*see also* SeaWiFS instrument.  
 voltmeter, 16(111–116); 34(67).  
 tests, 14(41–42).  
  
 – W, X, Y –  
 water samples, 25(39–42, 43–47).  
 water transmittance, 5(19); 13(4); 21(16, 19); 25(24).  
 water vapor transmittance, 9(5); 39(Fig. 2 p. 3).  
 wind:  
*see* data sets, gridded wind.  
*see* surface wind products.  
  
 – Z –  
 zenith, 2(10).  
 angles at equinox, 2(2, 16).  
 angles at solstice, 2(10, 16).  
 satellite angle, 13(15, 19, 46).  
 solar angle, 2(2, Fig. 3 p. 5, 10, Fig. 9 p. 12, Fig. 12 p. 15, Table 3 p. 16, 16); 3(2, 8, 23); 7(1, 4); 9(Table 6 p. 9); 13(Table 11 p. 29, 46); 28(5); 38(6, Fig. 37b p. 54); 40(34).  
 spacecraft angle, 2(2, Fig. 4 p. 6, 10, 16); 13(Table 11 p. 29); 28(5).

## GLOSSARY

- A -

A-band	Absorption Band
A/D	Analog-to-Digital (also written as AD)
A&M	(Texas) Agriculture and Mechanics (University)
AC	Alternating Current
ACC	Antarctic Circumpolar Current
ACRIM	Active Cavity Radiometer Irradiance Monitor
ACS	Attitude Control System
ADC	Analog-to-Digital Converter
ADCP	Acoustic Doppler Current Profiler
ADEOS	Advanced Earth Observation Satellite (Japan)
AE	Ångström Exponent
AIBOP	Automated and Interactive Bio-Optical Processing
ALSCAT	ALPHA and Scattering Meter [Note: the symbol $\alpha$ corresponds to $c(\lambda)$ , the beam attenuation coefficient, in present usage.]
AM-1	Not an acronym, used to designate the morning platform of EOS.
AMC	Angular Momentum Compensation
AMT	Atlantic Meridional Transect
AMT-1	The First AMT Cruise
ANSI	American National Standards Institute
AOCI	Airborne Ocean Color Imager
AOL	Airborne Oceanographic Lidar
AOP	Apparent Optical Property
AOS/LOS	Acquisition of Signal/Loss of Signal
APL	Applied Physics Laboratory
APT	Automatic Picture Transmission
ARGOS	Not an acronym, but the name given to the data collection and location system on the NOAA Operational Satellites.
ARI	Accelerated Research Initiative
ARS	Airborne Remote Sensing
ASCII	American Standard Code for Information Interchange
ASI	Italian Space Agency
ASR	Absolute Spectral Response
AT	Along-Track
ATBD	Algorithm Theoretical Basis Document
ATLAS	Auto-Tracking Land and Atmosphere Sensor
ATM	Airborne Thematic Mapper
ATSR	Along-Track Scanning Radiometer
AU	Astronomical Unit
AVHRR	Advanced Very High Resolution Radiometer
AVIRIS	Advanced Visible and Infrared Imaging Spectrometer
AXBT	Airborne Expendable Bathythermograph

- B -

BAOPW-1	First Bio-optical Algorithm and Optical Protocols Workshop
BAOPW-2	Second Bio-optical Algorithm and Optical Protocols Workshop
BAOPW-3	Third Bio-optical Algorithm and Optical Protocols Workshop
BAOPW-4	Fourth Bio-optical Algorithm and Optical Protocols Workshop
BAOPW-5	Fifth Bio-optical Algorithm and Optical Protocols Workshop
BAOPW-6	Sixth Bio-optical Algorithm and Optical Protocols Workshop
BAOPW-7	Seventh Bio-optical Algorithm and Optical Protocols Workshop
BAS	British Antarctic Survey
BATS	Bermuda Atlantic Time-Series Station
BBOP	Bermuda Bio-Optical Profiler
BBR	Band-to-Band Registration
BCRS	Dutch Remote Sensing Board
BEP	Benguela Ecology Programme
BER	Bit Error Rate
BIOS	Biophysical Interactions and Ocean Structure (NERC research program)
BMFT	Minister for Research and Technology (Germany)
BNL	Brookhaven National Laboratory
BNSC	British National Space Center
BOAWG	Bio-Optical Algorithm Working Group
BODC	British Oceanic Data Center
BOFS	British Ocean Flux Study
BOMS	Bio-Optical Moored Systems
BOPS	Bio-Optical Profiling System
bpi	bits per inch
BPM	Bedford Production Model
BRDF	Bidirectional Reflectance Distribution Function
BSI	Biospherical Instruments, Incorporated
BSIXR	BSI's Transfer Radiometer
BSM	Bio-Optical Synthetic Model
BTD	Bright Target Detection
BTR	Bright Target Recovery
BUV	Backscatter Ultraviolet Spectrometer
BWI	Baltimore-Washington International (airport)

- C -

C/N	Carbon-to-Nitrogen (ratio)
CalCOFI	California Cooperative Fisheries Institute
Cal/Val	Calibration and Validation
CALVAL	Calibration and Validation
Case-1	Water whose reflectance is determined solely by absorption.
Case-2	Water whose reflectance is significantly influenced by scattering.
CASI	Compact Airborne Spectrographic Imager
CCD	Charge Coupled Device
CCPO	Center for Coastal Physical Oceanography (Old Dominion University)
CDF	(NASA) Common Data Format
CDOM	Colored Dissolved Organic Material
CD-ROM	Compact Disk-Read Only Memory
CDR	Critical Design Review
CEC	Commission of the European Communities
CENR	Committee on Environment and Natural Resources
CHN	Carbon, Hydrogen, and Nitrogen
CHORS	Center for Hydro-Optics and Remote Sensing (San Diego State University)
c.i.	confidence interval
CICESE	<i>Centro de Investigación Científica y de Educación Superior de Ensenada</i> (Mexico)
CIMEL	Not an acronym, but the name of a sun photometer manufacturer.
CIRES	Cooperative Institute for Research in Environmental Sciences

SeaWiFS Prelaunch Technical Report Series Final Cumulative Index

COADS Comprehensive Ocean-Atmosphere Data Set  
 COARE Coupled Ocean-Atmosphere Response Experiment  
 COAST Coastal Earth Observation Application for Sediment Transport  
 COOP Coastal Ocean Optics Program  
 COTS Commercial Off-The-Shelf (software)  
 CPR Continuous Plankton Recorder  
 cpu Central Processing Unit  
 CRM Contrast Reduction Meter  
 CRN Italian Research Council  
 CRSEO Center for Remote Sensing and Environmental Optics (University of California at Santa Barbara)  
 CRT Calibrated Radiance Tapes or Cathode Ray Tube (depending on usage).  
 CRTT CZCS Radiation and Temperature Tape  
 CSIRO Commonwealth Scientific and Industrial Research Organization (of Australia)  
 CSC Computer Sciences Corporation  
 CSL Computer Systems Laboratory  
 CT Cross-Track  
 CTD Conductivity, Temperature, and Depth  
 c.v. coefficient of variation  
 CVT Calibration and Validation Team  
 CW Continuous Wave  
 CWL Center Wavelength  
 CWR Clear Water Radiance  
 CXR CHORS Transfer Radiometer  
 CZCS Coastal Zone Color Scanner

- D -

DAAC Distributed Active Archive Center  
 DAO Data Assimilation Office  
 DARR Data Analysis Round-Robin  
 DARR-94 First Data Analysis Round-Robin  
 DARR-2 Second Data Analysis Round-Robin  
 DAT Digital Audio Tape  
 DC Direct Current or Digital Count (depending on usage).  
 DCF Data Capture Facility  
 DCM Deep Chlorophyll Maximum  
 DCOM Dissolved Colored Organic Material  
 DCP Data Collection Platform  
 DEC Digital Equipment Corporation  
 DIM Depth Integrated Model  
 DIN Dissolved Inorganic Nitrogen  
 DIP Dissolved Inorganic Phosphate  
 DIW Distilled Water  
 DML Dunstaffnage Marine Laboratory (Scotland)  
 DMS dimethyl sulfide  
 DOC Dissolved Organic Carbon  
 DoD Department of Defense  
 DOE Department of Energy  
 DOM Dissolved Organic Matter  
 DON Dissolved Organic Nitrogen  
 DOS Disk Operating System  
 DSP Not an acronym, but an image display and analysis package developed at RSMAS—University of Miami.  
 DU Dobson Units  
 DUT Device Under Test  
 DXW Not an acronym, but a lamp designator.

- E -

E&P Eppley and Peterson (compilation)  
 E-mail Electronic Mail  
 EAFB Edwards Air Force Base  
 EC Excluding CHORS (data)  
 ECEF Earth-Centered Earth-Fixed  
 ECMWF European Centre for Medium Range Weather Forecasts  
 ECS EOSDIS Core System  
 ECT Equator Crossing Time  
 EDMED European Directory of Marine and Environmental Data  
 EDT Eastern Daylight Time  
 EEZ Exclusive Economic Zone  
 EG&G Not an acronym, but a shortened form of EG&G-Gamma Scientific (now known simply as Gamma Scientific).  
 ENSO El Niño Southern Oscillation  
 ENVISAT Environmental Satellite  
 EOF Empirical Orthogonal Function  
 EOS Earth Observing System  
 EOSAT Earth Observation Satellite Company  
 EOSDIS EOS Data Information System  
 EPA Environmental Protection Agency  
 EP-TOMS Earth Probe—Total Ozone Mapping Spectroradiometer  
 EqPac Equatorial Pacific (Process Study)  
 ER-2 Earth Resources-2  
 ERBE Earth Radiation Budget Experiment  
 ERBS Earth Radiation Budget Sensor  
 ERDAS Not an acronym, but a trade name for an image analysis system.  
 ERL (NOAA) Environmental Research Laboratories  
 ERS Earth Resources Satellite  
 ERS-1 European Remote Sensing Satellite  
 ESA European Space Agency  
 EST Eastern Standard Time  
 EURASEP European Association of Scientists in Environmental Pollution  
 EUVE Extreme Ultraviolet Explorer

- F -

FASCAL Fast Calibration (Facility)  
 FDDI Fiber Data Distribution Interface  
 FEL Not an acronym, but a lamp designator.  
 FGGE First GARP Global Experiment  
 FLUPAC (Geochemical) Fluxes in the Pacific (Ocean)  
 FNOC Fleet Numerical Oceanography Center  
 FORTRAN Formula Translation (computer language)  
 FOV Field-of-View  
 FPA Focal Point Assembly  
 FRD Federal Republic of Deutschland (Germany)  
 FRRF Fast Repetition Rate Fluorometer  
 ftp File Transfer Protocol  
 FWHM Full-Width at Half-Maximum  
 FY Fiscal Year

- G -

GAC Global Area Coverage, coarse resolution satellite data with a nominal ground resolution at nadir of approximately 4 km.  
 GARP Global Atmospheric Research Program  
 GASM General Angle Scattering Meter

gcc	GNU C Compiler	IDL	Interactive Data Language
GF/F	Not an acronym, but a specific type of glass fiber filter manufactured by Whatman.	IDS	Integrated Data System
GIN	Greenland, Iceland, and Norwegian Seas	IFOV	Instantaneous Field of View
GIS	Geographical Information System	IGBP	International Geosphere–Biosphere Programme
GISS	Goddard Institute for Space Studies	ILS	Incident Light Sensor
GLI	Global Imager	IMS	Information Management System
GLOBEC	Global Ocean Ecosystems dynamics	IOP	Inherent Optical Property
GMT	Greenwich Mean Time	IOSDL	Institute of Oceanographic Sciences, Deacon Laboratory (UK)
GNU	GNU's Not UNIX	IP	Internet Protocol
GOES	Geostationary Operational Environmental Satellite	IPD	Image Processing Division
GOFS	Global Ocean Flux Study	IR	Infrared
GOMEX	Gulf of Mexico Experiment	IRIX	Not an acronym, but a computer operating system.
GP	Global Processing (algorithm)	ISA	Integrating Sphere Accessory
GPM	General Perturbations Model	ISCCP	International Satellite Cloud Climatology Project
GPS	Global Positioning System	ISIC	Integrating Sphere Irradiance Collector
GRGS	Groupe de Recherche de Geodesie Spatial	ISTP	International Solar Terrestrial Program
GRIB	Gridded Binary	IUCRM	Inter-Union Commission on Radio Meteorology
GRIDTOMS	Gridded TOMS (data set)	IUE	International Ultraviolet Explorer
GSFC	Goddard Space Flight Center	– J –	
GSO	Graduate School of Oceanography (University of Rhode Island)	JAM	JYACC Application Manager
G/T	System Gain/Total System Noise Temperature	JARE	Japanese Antarctic Research Expedition
GUI	Graphical User Interface	JCR (RRS)	<i>James Clark Ross</i>
– H –		JGOFS	Joint Global Ocean Flux Study
HAPEX	Hydrological Atmospheric Pilot Experiment	JHU	Johns Hopkins University
HDDT	High Density Data Tape	JOI	Joint Oceanographic Institute
HDF	Hierarchical Data Format	JPL	Jet Propulsion Laboratory
HEI	Hoffman Engineering, Incorporated	JRC	Joint Research Center
HeNe	Helium-Neon	JYACC	Not an acronym, but the name of the company that makes JAM.
HHCRM	Hand-Held Contrast Reduction Meter	– K –	
HIRIS	High Resolution Imaging Spectrometer	KQ	$K_d$ Quality (flag)
HN	(Polaroid) Not an acronym, but a linear sheet polarizer used to check the polarization sensitivity of SeaWiFS bands 7 and 8.	– L –	
HOTS	Hawaiian Optical Time Series	L&N	Leeds & Northrup
HP	Hewlett Packard	LAC	Local Area Coverage, fine resolution satellite data with a nominal ground resolution at nadir of approximately 1 km.
HPGL	Hewlett Packard Graphics Language	LAN	Local Area Network
HPLC	High Performance Liquid Chromatography	LANDSAT	Land Resources Satellite
HQ	Headquarters	LCD	Least Common Denominator (file)
HR	(Polaroid) Not an acronym, but a linear sheet polarizer used to check the polarization sensitivity of SeaWiFS bands 1–6.	LDEO	Lamont–Doherty Earth Observatory (Columbia University)
HRPT	High Resolution Picture Transmission	LDGO	Lamont–Doherty Geological Observatory (Columbia University)
HST	Hawaii Standard Time	LDTNLR	Local Dynamic Threshold Nonlinear Raleigh Level-0 Raw data.
HYDRA	Hydrographic Data Reduction and Analysis	Level-1	Calibrated radiances.
– I –		Level-2	Derived products.
I/O	Input/Output	Level-3	Gridded and averaged derived products.
IAPSO	International Association for the Physical Sciences of the Ocean	LHCII	Light-Harvesting Complex II
IAU	International Astrophysical Union	LMCE	<i>Laboratoire de Modélisation du climat et de l'Environnement</i> (France)
IBM	International Business Machines	LOC	Local Time
ICARUS	Instrumentation Characterizing Aerosol Radii Using Sun photometry	LODYC	<i>Laboratoire d'Océanographie et de Dynamique du climat</i> (France)
ICD	Interface Control Document	LOICZ	Land Ocean Interaction in the Coastal Zone
ICES	International Council on Exploration of the Seas	LOIS	Land–Ocean Interaction Study
ICESS	Institute for Computational Earth System Science (University of California at Santa Barbara)	LOMAS	Land Ocean Margins Server

SeaWiFS Prelaunch Technical Report Series Final Cumulative Index

LPCM *Laboratoire de Physique et Chimie Marines*  
(France)

LRER Long-Range Ecological Research  
LSB Least Significant Bits  
LSF Line Spread Function  
LUT Look-Up Table

- M -

MAFF Ministry of Agriculture, Fisheries, and Food  
(UK)

MARAS Marine Radiometric Spectrometer

MAREX Marine Resources Experiment Program

MARMAP Marine Resources Monitoring, Assessment, and  
Prediction

MARS Multispectral Airborne Radiometer System

MASSS Multi-Agency Ship-Scheduling for SeaWiFS

MBARI Monterey Bay Aquarium Research Institute

MCMC Markov Chain Monte Carlo

MEM Maximum Entropy Method

MER Marine Environmental Radiometer

MERIS Medium Resolution Imaging Spectrometer

METEOSAT Meteorological Satellite

MF Major Frame

mF Minor Frame

MIPS Millions of Instructions Per Second

MIT Massachusetts Institute of Technology

MIZ Marginal Ice Zone

MLE Maximum Likelihood Estimator

MLML Moss Landing Marine Laboratory (San Jose  
State University)

MO Magneto-Optical

MOBY Marine Optical Buoy

MOCE Marine Optical Characterization Experiment

MODARCH MODIS Document Archive

MODIS Moderate Resolution Imaging Spectroradiome-  
ter

MODIS-N Nadir-viewing MODIS instrument

MODIS-T Tilted MODIS instrument to minimize sun glint

MOS Marine Optical Spectroradiometer

MOU Memorandum of Understanding

MRF Meteorological Research Flight

MSB Most Significant Bits

MS/DOS Microsoft/Disk Operating System (also written  
as MS-DOS)

MTF Modulation Transfer Function

MTPE Mission to Planet Earth

MVDS Multichannel Visible Detector System

Myr Millions of Years

- N -

NABE North Atlantic Bloom Experiment

NAS National Academy of Science

NASA National Aeronautics and Space Administra-  
tion

NASCOM NASA Communications

NASDA National Space Development Agency (Japan)

NASIC NASA Aircraft/Satellite Instrument Calibra-  
tion

NAVSPASUR Naval Space Surface Surveillance

NCAR National Center for Atmospheric Research

NCCOSC Navy Command, Control, and Ocean Surveil-  
lance Center

NCDC (NOAA) National Climatic Data Center

NCDS NASA Climate Data System

NCSA National Center for Supercomputing Applica-  
tions

NCSU North Carolina State University

NDBC National Data Buoy Center

NDVI Normalized Difference Vegetation Index

NEAT Northeast Atlantic

NECC North Equatorial Counter Current

NEdL Noise Equivalent Differential Spectral Radiance

NEΔT Noise Equivalent Delta Temperature

NEδL Noise Equivalent delta Radiance

NER Noise Equivalent Radiance

NERC Natural Environment Research Council (UK)

NESDIS National Environmental Satellite Data Infor-  
mation Service

NESS National Environmental Satellite Service

NET NIMBUS Experiment Team

netCDF (NASA) Network Common Data Format

NFS Network File System

NGDC National Geophysical Data Center

NIMBUS Not an acronym, but a series of NASA experi-  
mental weather satellites containing a wide va-  
riety of atmosphere, ice, and ocean sensors.

NIR Near-Infrared

NIST National Institute of Standards and Technol-  
ogy

NMC National Meteorological Center

NMFS National Marine Fisheries Service

NOAA National Oceanic and Atmospheric Adminis-  
tration

NOARL Naval Oceanographic and Atmospheric Re-  
search Laboratory

NODC National Oceanographic Data Center

NORAD North American Air Defense (Command)

NOPS NIMBUS Observation Processing System

NOS National Ocean Service

NRA NASA Research Announcement

NRaD Naval Research and Development

NRIFSF National Research Institute of Far Seas Fish-  
eries (Japan)

NRL Naval Research Laboratory

NRT Near-Real Time

NSCAT NASA Scatterometer

NSF National Science Foundation

NSSDC National Space Science Data Center

- O -

OAM Optically Active Materials

OBP Ocean Biogeochemistry Program

OCDM Ocean Color Data Mission

OCEAN Ocean Colour European Archive Network

OCI Ocean Color Irradiance (sensor)

OCR Ocean Color Radiance (sensor)

OCS Ocean Color Scanner

OCTS Ocean Color and Temperature Sensor (Japan)

ODAS Ocean Data Acquisition System

ODEX Optical Dynamics Experiment

ODU Old Dominion University

OFFI Optical Free-Fall Instrument

OI Original Irradiance

OL Optronics Laboratories

OLIPAC Oligotrophy in the Pacific (Ocean)

OMEX Ocean Marine Exchange

OMP-8 Not an acronym, but a type of marine anti-biofouling compound.  
 ONR Office of Naval Research  
 OPC Optical Plankton Counter  
 OPPWG Ocean Primary Productivity Working Group  
 OPT Ozone Processing Team  
 OrbView-2 Not an acronym, but the name of the satellite (formerly known as SeaStar) on which the SeaWiFS instrument was launched.  
 ORKA On-line Real-time Knowledge-based Analysis  
 OS Operating System  
 OSC Orbital Sciences Corporation  
 OSFI Optical Surface Floating Instrument  
 OSSA Office of Space Science and Applications  
 OSU Oregon State University

## - P -

P-I Production-Irradiance  
 PACE Plymouth Atmospheric Correction Experiment (UK)  
 PAR Photosynthetically Available Radiation  
 PC (IBM) Personal Computer  
 PCASP Passive Cavity Aerosol Spectrometer Probe (UK)  
 PDR Preliminary Design Review  
 PDT Pacific Daylight Time  
 PFF Programmable Frame Formatter  
 PGS Product Generation System  
 PI Principal Investigator  
 PIKE Phased Illuminated Knife Edge  
 PlyMBODy Plymouth Marine Bio-Optical Data Buoy (UK)  
 PM-1 Not an acronym, used to designate the afternoon platform of EOS.  
 PMEL Pacific Marine Environmental Laboratory  
 PMI Programmable Multispectral Imager  
 PML Plymouth Marine Laboratory (UK)  
 POC Particulate Organic Carbon  
 POLDER Polarization Detecting Environmental Radiometer (France) or Polarization and Directionality of the Earth's Reflectance (depending on usage).  
 PON Particulate Organic Nitrogen  
 PPARR-1 First Primary Productivity Algorithm Round-Robin (October 1995)  
 PPARR-2 Second Primary Productivity Algorithm Round-Robin (August 1997)  
 PPARR-3 Third Primary Productivity Algorithm Round-Robin  
 PPC Photoprotectant Carotenoids  
 ppm parts per million  
 PR Photo Research  
 PRIME Plankton Reactivity in the Marine Environment (UK)  
 PRR Profiling Reflectance Radiometer  
 PRT Platinum Resistance Thermometer  
 PSC Photosynthetic Carotenoids  
 PSII Photosystem II  
 PST Pacific Standard Time  
 PSU Practical Salinity Units  
 PTFE Polytetrafluoroethylene  
 PUR Photosynthetically Usable Radiation  
 PZN Phytoplankton, Zooplankton, and Nutrients

- Q -  
 QC Quality Control  
 QED Quantum Efficient Device  
 QUBIT Trade name of commercial data logging system.

## - R -

R&A Research and Applications  
 R&D Research and Development  
 R/V Research Vessel  
 RACER Research on Antarctic Coastal Ecosystem Rates  
 RACS(C) Rivers Basins-Atmosphere-Coast and Estuaries Study (Coastal)  
 RAF Royal Air Force (UK)  
 RC Resistor-Capacitor (circuit)  
 RDBMS Relational Database Management System  
 RDF Radio Direction Finder  
 RDI RD Instruments  
 RF Radio Frequency  
 RFP Request for Proposals  
 RISC Reduced Instruction Set Computer  
 rms root mean squared  
 ROSIS Remote Sensing Imaging Spectrometer, also known as the Reflective Optics System Imaging Spectrometer (Germany)  
 ROV Remotely Operated Vehicle  
 ROW Reverse Osmosis Water  
 RR Round-Robin  
 RRS Royal Research Ship  
 RSADU Remote Sensing Applications Development Unit  
 RSMAS Rosenstiel School for Marine and Atmospheric Sciences (University of Miami)  
 RSS Remote Sensing Systems (Inc.)  
 RTM Reversing Thermometer  
 RTOP Research and Technology Operation Plan

## - S -

S/C Spacecraft  
 S/N Serial Number  
 SAC Satellite Applications Centre  
 SARSAT Search and Rescue Satellite  
 SBE Sea-Bird Electronics  
 SBRC (Hughes) Santa Barbara Research Center  
 SBRS (Hughes) Santa Barbara Remote Sensing (new name for SBRC)  
 SBUV Solar Backscatter Ultraviolet Radiometer  
 SBUV-2 Second Solar Backscatter Ultraviolet Radiometer  
 SCADP SeaWiFS Calibration and Acceptance Data Package  
 SCDR SeaWiFS Critical Design Review  
 SCF Science Computing Facility  
 SCOR Scientific Committee on Oceanographic Research  
 SDPS SeaWiFS Data Processing System  
 SDS Scientific Data Set  
 SDSU San Diego State University  
 SDY Sequential Day of the Year  
 SeaBAM SeaWiFS Bio-Optical Algorithm Mini-workshop  
 SeaBASS SeaWiFS Bio-Optical Archive and Storage System  
 SeaDAS SeaWiFS Data Analysis System

## SeaWiFS Prelaunch Technical Report Series Final Cumulative Index

<b>SeaOPS</b>	SeaWiFS Optical Profiling System	<b>Sterna</b>	Not an acronym, but a BOFS Antarctic research project.
<b>SEAPAK</b>	Not an acronym, but an image display and analysis package developed at GSFC.	<b>STM</b>	Science Team Member
<b>SeaSCOPE</b>	SeaWiFS Study of Climate, Ocean Productivity, and Environmental Change	<b>SUDS</b>	Submersible Upwelling and Downwelling Spectrometer
<b>SeaStar</b>	Not an acronym, but the former name of the satellite on which SeaWiFS was launched; now known as OrbView-2.	<b>SUN</b>	Sun Microsystems
<b>SeaWiFS</b>	Sea-viewing Wide Field-of-view Sensor	<b>SWAP</b>	<i>Sylter Wattenmeer Austausch-Prozesse</i>
SEEP	Shelf Edge Exchange Program	<b>SWG</b>	Science Working Group
SEI	SeaWiFS Exploitation Initiative (UK)	<b>SWIR</b>	Shortwave Infrared
SEIBASS	SeaWiFS Exploitation Initiative Bio-Optical Archive and Storage System (UK)	<b>SWL</b>	Safe Working Load
SES	Shelf Edge Study	<b>SXR</b>	SeaWiFS Transfer Radiometer
SFP	Size-Fractionated Pigments		
SGI	Silicon Graphics, Incorporated		
SHP	Shaft Horsepower		
SI	International System of Units or <i>Système International d'Unités</i>	<b>- T -</b>	
SIG	Special Interest Group	T-S	Temperature-Salinity
SIMBIOS	Sensor Intercomparison and Merger for Biological and Interdisciplinary Ocean Studies	TAE	Transportable Applications Executive
SIO	Scripps Institution of Oceanography	TAO	Thermal Array for the Ocean or more recently, Tropical Atmosphere-Ocean
SIO/MPL	Scripps Institution of Oceanography/Marine Physical Laboratory	TBD	To Be Determined
SIRREX	SeaWiFS Intercalibration Round-Robin Experiment	TBUS	Not an acronym, but a NOAA orbital element.
SIRREX-1	The First SIRREX (July 1992)	TDI	Time-Delay and Integration
SIRREX-2	The Second SIRREX (June 1993)	TDRSS	Tracking and Data Relay Satellite System
SIRREX-3	The Third SIRREX (September 1994)	TIM	Time Integrated Model
SIRREX-4	The Fourth SIRREX (May 1995)	TIROS	Television Infrared Observation Satellite
SIRREX-5	The Fifth SIRREX (July 1996)	TLCF	Team Leader Computing Facility
SIS	Spherical Integrating Source or <i>Sensoren-Instrumente Système</i> (depending on usage).	TLM	Telemetry
SISSR	Submerged <i>In Situ</i> Spectral Radiometer	TM	Technical Memorandum
SJSU	San Jose State University	TOA	Top of the Atmosphere
SMM	Solar Maximum Mission	TOGA	Tropical Ocean Global Atmosphere program
SNR	Signal-to-Noise Ratio	TOMS	Total Ozone Mapping Spectrometer
SO	Southern Ocean (algorithm)	TOPEX	Topography Experiment
SOC	Southampton Oceanography Center (UK) or Simulation Operations Center (depending on usage).	TOVS	TIROS Operational Vertical Sounder
SOGS	SeaStar Operations Ground Subsystem	TRMM	Tropical Rainfall Measuring Mission
SOH	State of Health	TSM	Total Suspended Material
SOW	Statement of Work	TV	Thermal Vacuum
SPIE	Society of Photo-Optical Instrumentation Engineers		
SPM	Suspended Particulate Material or Special Perturbations Model (depending on usage).	<b>- U -</b>	
SPMPR	SeaWiFS Post-Modification Preship Review	UA	University of Arizona
SPO	SeaWiFS Project Office	UARS	Upper Atmosphere Research Satellite
SPOT	<i>Satellite Pour l'Observation de la Terre</i> (France)	UAXR	University of Arizona's Transfer Radiometer
SPR	SeaWiFS Preship Review	UCAR	University Consortium for Atmospheric Research
SPSWG	SeaWiFS Prelaunch Science Working Group	UCMBO	University of California Marine Bio-Optics
SQL	Sequential Query Language	UCSB	University of California at Santa Barbara
SRC	Satellite Receiving Station (NERC)	UCSD	University of California at San Diego
SRT	Sigma Research Technology, Incorporated	UH	University of Hawaii
SSLSP	SeaWiFS Stray Light Signal Paths	UIC	Underway Instrumentation and Control (room)
SSM/I	Special Sensor for Microwave/Imaging	UIM/X	User Interface Management/X-Windows
SST	Sea Surface Temperature or SeaWiFS Science Team (depending on usage).	UM	University of Miami
ST	Science Team	UNESCO	United Nations Educational, Scientific, and Cultural Organization
		UNIX	Not an acronym, but a computer operating system.
		UoP	University of Plymouth (UK)
		UOR	Undulating Oceanographic Recorder
		UPS	Uninterruptable Power System
		URI	University of Rhode Island
		URL	Universal Resource Locator
		USC	University of Southern California
		USDA	United States Department of Agriculture
		USF	University of South Florida
		UTC	Coordinated Universal Time (definition reflects actual usage instead of following the letters of the acronym)

UTM Universal Transverse Mercator (projection)

UV Ultraviolet

UVB Ultraviolet-B

UWG User Working Group

- V -

V0 Version 0

V1 Version 1

VAX Virtual Address Extension

VCS Version Control Software

VDC Volts Direct Current

VGPM Vertically Generalized Production Model

VHF Very High Frequency

VHRR Very High Resolution Radiometer

VI Virtual Instrument

VISLAB Visibility Laboratory (Scripps Institution of  
Oceanography)

VISNIR Visible and Near Infrared

VMS Virtual Memory System

VSF Volume Scattering Function

- W -

WFF Wallops Flight Facility

WHOI Woods Hole Oceanographic Institute

WIM Wavelength Integrated Model

WMO World Meteorological Organization

WOCE World Ocean Circulation Experiment

WORM Write-Once Read-Many (times)

WP2 Not an acronym, but a standard net mesh size  
(200  $\mu\text{m}$ ).

WRM Wavelength Resolved Model

WVS World Vector Shoreline

- X -

XBT Expendable Bathythermograph

XDR External Data Representation

- Y, Z -

YBOM Yamato Bank Optical Mooring

## SYMBOLS

### - A -

- $a$  The semi-major axis of the Earth's orbit; a formulation constant; a constant equal to 0.983; a constant equal to  $-20/\tanh(2)$ ; an exponential value in the expression relating the radiance of scattered light to wavelength; or a regression coefficient (depending on usage).
- $\bar{a}$  The measured value of  $a$ .
- $a'$  The absorption at the Raman excitation wavelength.
- $a(\lambda)$  Total absorption coefficient.
- $a(z, \lambda)$  Spectral absorption coefficient.
- $a_a$  The specific absorption of chlorophyll  $a$ .
- $a_{abc}$  The specific absorption of chlorophylls  $a$ ,  $b$ , and  $c$ .
- $a_b$  The specific absorption of chlorophyll  $b$ .
- $a_c$  The specific absorption of chlorophyll  $c$ .
- $a_e(\lambda)$  Absorption coefficient due to substances other than water.
- $a_f(z, \lambda)$   $a_p(\lambda) - a_t(z, \lambda)$ .
- $a_g$  The DOM/detritus specific absorbance.
- $a_g(\lambda)$  Gelbstoff spectral absorption coefficient.
- $a_i$  Cubic polynomial coefficients.
- $a_i(\lambda_a, T)$  Initial estimate of the apparent absorption coefficient; used for determining the apparent absorption coefficient for substances other than water.
- $a_N$  Normalized absorption coefficient.
- $a_o$  Oxygen absorption coefficient.
- $a_{ox}$  Coefficient for oxygen absorption.
- $a_{oz}$  Coefficient for ozone absorption.
- $a_p(\lambda)$  Particulate spectral absorption coefficient.
- $a_{PP}$  The specific absorption of PPC.
- $a_{ps}(\lambda)$  Photosynthetically active pigment spectral absorption coefficient.
- $a_{PS}$  The specific absorption of PSC.
- $a_s(\lambda)$  The sediment specific absorption coefficient.
- $a_t(\lambda)$  Tripton spectral absorption coefficient.
- $a_w(\lambda)$  The absorption coefficient for pure water.
- $a_{vv}$  Coefficient for water vapor absorption.
- $a_\phi$  The DOM/chlorophyll combined absorbance.
- $a_\phi(\lambda)$  Phytoplankton pigment spectral absorption coefficient.
- $a_\phi^M(\lambda)$  Phytoplankton pigment spectral absorption coefficient determined in methanol extract.
- $A$  Fitting coefficient for  $P_4 - X$ , or the clearance area of a filter (depending on usage).
- $A(k)$  Absorptivity.
- $A(\lambda)$  Coefficient for calculating  $b_b(\lambda)$ .
- $A(\lambda_a)$  AC-9 instrument calibration factor for absorption.
- $A(\lambda_c)$  AC-9 instrument calibration factor for beam attenuation.
- $A_0$  Coefficient for the linear term in the scan modulation correction equation.
- $A_d$  The detector aperture.
- $A_d(\bar{z}, \lambda)$  Linear regression intercepts at the center of a fitted depth interval for  $\ln A_d(z, \lambda)$  (defined in Vol. 26).
- $A_f$  The foam reflectance.
- $A_i$  The intersection area, or an arbitrary constant (depending on usage).
- $A'_i$  An arbitrary constant.
- $A_j$  An arbitrary constant.
- $A'_j$  An arbitrary constant.
- $A_l(\bar{z}, \lambda)$  Linear regression intercepts at the center of a fitted depth interval for  $\ln A_l(z, \lambda)$  (defined in Vol. 26).
- $A_u(\bar{z}, \lambda)$  Linear regression intercepts at the center of a fitted depth interval for  $\ln A_u(z, \lambda)$  (defined in Vol. 26).

### - B -

- $b$  A formulation coefficient, a constant equal to  $1/3$ , or a regression coefficient (depending on usage).
- $b(z, \lambda)$  The total scattering coefficient.
- $b(\theta, z, \lambda_0)$  Volume scattering coefficient.
- $b_b$  Backscattering coefficient.
- $\bar{b}_b(\lambda)$  The backscatter ratio ( $b_b/b$ ).
- $b_b(z, \lambda)$  The spectral backscattering coefficient.
- $b_{bc}(\lambda)$  The spectral backscattering coefficient for phytoplankton.
- $b_{bp}$  The particle specific backscatter coefficient (usually normalized to chlorophyll  $a$  concentration).
- $b_{bw}$  The backscatter coefficient of water.
- $b_i(\lambda)$  Initial estimate of the particle scattering coefficient; used for determining the apparent particle scattering coefficient for substances other than water.
- $b_{min}$  Scattering associated with phytoplankton (Prieur and Sathyendranath 1981).
- $b_p(\lambda)$  Total particle scattering.
- $b_r(\lambda)$  Total Raman scattering coefficient.
- $b_R$  The Raman scattering coefficient.
- $b_s(\lambda)$  The sediment specific scattering coefficient.
- $b_w(\lambda)$  The total scattering coefficient for pure seawater.
- $b1(k)$  Input data for polarization calculations for SeaWiFS band 1.
- $b7(k)$  Input data for polarization calculations for SeaWiFS band 7.
- $B$  Excess target radiance; the fitting coefficient for  $e^{B/P_5}$ ; the width of band 7; a variable in the expression for limiting reflectance ( $R_{lim}$ ), defined as  $0.33b/K_d$ ; or an empirical constant (depending on usage).
- $B(\lambda)$  Coefficient for calculating  $b_b(\lambda)$ .
- $B_0$  Coefficient for the power term in the scan modulation correction equation.
- $B_1$  BBOP casts 1 m from the ship's stern.
- $B_6$  BBOP casts 6 m from the ship's stern.
- $B_b$  An empirical constant dependent on the backscatter ratio.
- $B_b(\lambda)$  Greybody radiance model.

### - C -

- $\bar{c}$  The measured value of  $c$ .
- $c(z, \lambda)$  Spectral beam attenuation coefficient.
- $c(z, 660)$  Red beam attenuation (at 660 nm).
- $c_e(\lambda)$  Corrected non-water beam attenuation coefficient.
- $c_i(\lambda)$  Initial estimate of the beam attenuation coefficient (used for determining the apparent beam attenuation coefficient for substances other than water).
- $c_p(\lambda)$  Beam attenuation coefficient due to particles.
- $c_w(\lambda)$  Beam attenuation coefficient for pure water equal to  $a_w(\lambda) + b_w(\lambda)$ .
- $[chl. a]/K$  Concentration of chlorophyll  $a$  over  $K$ , the diffuse attenuation coefficient.
- $C$  Chlorophyll  $a$  pigment, or just pigment concentration.
- $C'(\lambda)$  AC-9 factory calibration coefficient.
- $C'_r(\lambda)$  Additional AC-9 factory calibration coefficient.
- $C_1$  Measured value for the flight diffuser on a given scan line in counts, or a polynomial regression factor (depending on usage).
- $C_2$  Measured value of the flight diffuser for the scan line immediately sequential to the first scan line used to measure the flight diffuser (i.e.,  $S_1$  in counts).

$C_{13}$	Pigment concentration derived using CZCS bands 1 and 3.	$E(\lambda, 50)$	Spectral irradiance measured at 50 cm from a source.
$C_{23}$	Pigment concentration derived using CZCS bands 2 and 3.	$E_0$	Incident downwelling irradiance.
$C_a$	The concentration of chlorophyll <i>a</i> .	$E'_0$	The downwelling irradiance at the Raman excitation wavelength.
$C_{abc}$	The concentration of chlorophylls <i>a</i> , <i>b</i> , and <i>c</i> .	$E_a(\lambda)$	Irradiance in air.
$C_b$	The concentration of chlorophyll <i>b</i> .	$E_{\text{beg}}$	Beginning irradiance value.
$C_c$	The concentration of chlorophyll <i>c</i> .	$E_{\text{cal}}$	Calibration source irradiance.
$C_{\text{dark}}$	Instrument dark restore value, in counts.	$E_d(\lambda)$	Incident downwelling irradiance.
$C_{\text{est}}$	Estimated chlorophyll concentration.	$E_d(0, \lambda)$	Surface irradiance.
$C_{\text{ext}}$	Average total extinction cross-section of a particle.	$E_d(0^-, \lambda)$	Incident spectral irradiance.
$C_F$	The calibration factor.	$E_d(z, \lambda)$	Downwelling spectral irradiance profile.
$C_K$	Average chlorophyll <i>a</i> concentration within the first optical depth ( $\text{mgChl m}^{-3}$ ).	$E'_d(z, \lambda)$	Normalized downwelled spectral irradiance.
$C_{\text{out}}$	Instrument output, in counts.	$E_{\text{end}}$	Ending irradiance value.
$C_P$	Phaeopigment concentration.	$E_{\text{meas}}(\lambda)$	Measured radiance.
$C_{PP}$	PPC concentration.	$E_s(z, \lambda)$	Vertical profile of surface irradiance.
$C_{PS}$	PSC concentration.	$\bar{E}_s(z_m, \lambda)$	Defined as $H\bar{E}_s(\lambda)$ .
$C_r(\lambda)$	Digital response of reference detector.	$E_s(\lambda)$	Surface irradiance.
$C_{\text{ref}}$	Reference chlorophyll value (0.5).	$\bar{E}_s(\lambda)$	The measured irradiance vector of length $M$ .
$C_{\text{sat}}$	Satellite-based surface chlorophyll concentration ( $\text{mgChl m}^{-3}$ ).	$\bar{E}_{s,i}(\lambda)$	The value of $E_s(z, \lambda)$ at node depth $z_i$ .
$C_S$	Simulated $C$ .	$E_{\text{ref}}(\lambda)$	Reference radiance.
$C_{\text{sed}}$	Sediment concentration (SPM).	$E_{\text{rem}}$	Percentage of energy removed from a wavelength band.
$C_t(\lambda)$	Digital response of water transmission detector.	$E_{\text{sky}}(\lambda)$	Spectral sky irradiance distribution.
$C_{\text{temp}}$	Temperature sensor output, in counts, represented by an 8-bit digital word in the SeaStar telemetry.	$E_{\text{sun}}(z, \lambda)$	Spectral sun irradiance distribution.
$C_{TP}$	Total pigment concentration.	$E_u(z, \lambda)$	Upwelling spectral irradiance profile.
$[C + P]$	Pigment concentration defined as milligrams of chlorophyll <i>a</i> plus phaeopigments per cubic meter.	$E_u(0^-, \lambda)$	Upwelling spectral irradiance just beneath the sea surface.
$(\text{CO}_2)_{\text{GLOB}}$	Global CO <sub>2</sub> concentration in parts per million.	$E_w(z, \lambda)$	Irradiance in water.
		$E_{\text{wn}}(\lambda)$	Normalized water-leaving irradiance.

## - D -

$d$	The distance between source and detector apertures.
$d(I(\lambda))$	An increment in detector current.
$d_i$	Distance from the $i$ th observation point to the point of interest.
$d_j$	Distance from the $j$ th observation point to the point of interest.
$d_{PC}$	Daily depth-integrated primary production ( $\text{mgC m}^{-2} \text{d}^{-1}$ ).
$ds$	Detector configuration datum.
$d\lambda$	An increment in wavelength.
$D$	Sequential day of the year.
$\vec{D}$	Orbit position difference vector.
$D_{\text{at}}$	Along-track position difference.
$D_{\text{ct}}$	Cross-track position difference.
$D_{\text{rad}}$	Radial position difference.
$DC$	Digital count (value), or direct current (depending on usage).
$DC_{10}$	Digital counts at 10-bit digitization.
$DC_{\text{meas}}$	The digital counts measured unshadowed.
$DC_{\text{scat}}$	The digital counts due to scattered sunlight.
$DC_{TOA}$	The digital counts measured at the top of the atmosphere.
$DL$	Day length.

## - E -

$e$	Orbit eccentricity of the Earth.
$\hat{E}(z, m)$	A smoothed estimate of irradiance obtained by a least-squares regression fit in the center of a depth interval.
$E(\lambda)$	Spectral irradiance.

$E(\lambda, 50)$	Spectral irradiance measured at 50 cm from a source.
$E_0$	Incident downwelling irradiance.
$E'_0$	The downwelling irradiance at the Raman excitation wavelength.
$E_a(\lambda)$	Irradiance in air.
$E_{\text{beg}}$	Beginning irradiance value.
$E_{\text{cal}}$	Calibration source irradiance.
$E_d(\lambda)$	Incident downwelling irradiance.
$E_d(0, \lambda)$	Surface irradiance.
$E_d(0^-, \lambda)$	Incident spectral irradiance.
$E_d(z, \lambda)$	Downwelling spectral irradiance profile.
$E'_d(z, \lambda)$	Normalized downwelled spectral irradiance.
$E_{\text{end}}$	Ending irradiance value.
$E_{\text{meas}}(\lambda)$	Measured radiance.
$E_s(z, \lambda)$	Vertical profile of surface irradiance.
$\bar{E}_s(z_m, \lambda)$	Defined as $H\bar{E}_s(\lambda)$ .
$E_s(\lambda)$	Surface irradiance.
$\bar{E}_s(\lambda)$	The measured irradiance vector of length $M$ .
$\bar{E}_{s,i}(\lambda)$	The value of $E_s(z, \lambda)$ at node depth $z_i$ .
$E_{\text{ref}}(\lambda)$	Reference radiance.
$E_{\text{rem}}$	Percentage of energy removed from a wavelength band.
$E_{\text{sky}}(\lambda)$	Spectral sky irradiance distribution.
$E_{\text{sun}}(z, \lambda)$	Spectral sun irradiance distribution.
$E_u(z, \lambda)$	Upwelling spectral irradiance profile.
$E_u(0^-, \lambda)$	Upwelling spectral irradiance just beneath the sea surface.
$E_w(z, \lambda)$	Irradiance in water.
$E_{\text{wn}}(\lambda)$	Normalized water-leaving irradiance.

## - F -

$f$	The fraction of the surface covered by foam, the ratio of sensor-to-instrument diameters, a factor relating IOPs to irradiance reflectance, or the ratio of new primary production to total primary production (depending on usage).
$f_i$	Filter number, $i=0-11$ .
$f(T)$	Offset voltage correction from the linear function characterizing temperature response.
$f(\lambda)$	Instrument spectral response function.
$f\text{-ratio}$	The ratio of new to total production.
$F$	Fluorescence.
$\bar{F}$	Arithmetic average.
$\bar{F}(\lambda)$	A mean conversion factor.
$F(\lambda)$	A calibration factor.
$F(\lambda)$	A conversion factor to convert PR714 readings to the GSFC sphere radiance scale.
$\bar{F}(\lambda)$	Average of calibration factors.
$F_0$	The extraterrestrial irradiance corrected for Earth-sun distance, or initial fluorescence (depending on usage).
$F_0$	The scalar value of the solar spectral irradiance at the top of the atmosphere, multiplied by a columnar matrix of the four Stokes parameters (1/2, 1/2, 0, 0).
$\bar{F}_0$	Mean solar irradiance.
$F'_0$	Extraterrestrial irradiance corrected for the atmosphere.
$F_0(\lambda)$	Mean extraterrestrial spectral irradiance.
$\bar{F}_0(\lambda)$	Mean extraterrestrial irradiance.
$F_1$	Pigment biomass loading factor.
$F_2$	Detritus concentration loading factor.

SeaWiFS Prelaunch Technical Report Series Final Cumulative Index

- $F_3$  Carotenoid concentration (or relative pigment abundance) loading factor.
- $F_a$  Forward scattering probability of the aerosol.
- $F_d$  The total flux incident on the surface if it did not reflect light.
- $F'_d$  The total flux incident on the surface, corrected for surface reflection.
- $F''_d$  The scalar value of the total flux incident on the surface, corrected for surface reflection, multiplied by a columnar matrix of the four Stokes parameters.
- $F_{\text{GAC}}$  A GAC correction factor.
- $F_i$  A correction factor, or an immersion coefficient (depending on usage).
- $F_m$  Total sample maximal fluorescence (directly comparable to values measured by standard active fluorometers).
- $F_{SL}$  A correction factor for stray light.
- $F_v(\lambda)$  Field-of-view coefficient or variable fluorescence,  $F_m - F_0$ .

- G -

- $g$  A constant that consists of the ratios of the air-sea interface effects, the effects of the light field, and the relative spectral variation of  $Q$ .
- $g(T)$  Coefficient of a linear function characterizing temperature response.
- $g_1$  A constant equal to 0.82.
- $g_2$  A constant equal to -0.55.
- $g_{ij}$  Integrals of  $\gamma_{ij}$  (defined in Vol. 26).
- $g_s$  Gain selection datum.
- $G$  Gain factor, or the concentration of DOM and DOM-like absorbers (depending on usage).
- $G(z, \lambda)$  Solid angle dependence with water depth.
- $G(\lambda)$   $\dot{R}_a(\lambda_i)/\dot{R}_a(670) = (670/\lambda)^{\gamma} T_{2r}(670)/T_{2r}(\lambda_i)$ .
- $G(\mu_0, \lambda)$  The effect of the downwelling light field.
- $G_1$  Gain setting 1.
- $G_2$  Gain setting 2.
- $G_3$  Gain setting 3.
- $G_4$  Gain setting 4.
- $G_e$  Gravitational constant of the Earth (398,600.5 km<sup>3</sup> s<sup>-2</sup>).
- $G_n$  Gain factor at gain setting  $n$ .

- H -

- $h(k)$  Residual values without the calculated sinusoidal response.
- $h(\lambda)$  Normalized response function.
- $h_{ij}$  Analytic integral coefficients over the Hermitian polynomials  $\gamma_{ij}$ .
- $h_{mj}$  Matrix elements (defined in Vol. 26).
- $H$  Matrix of coefficients  $h_{ij}$ , or  $[h_{mj}]$  (depending on usage).
- $H(\lambda_i:\lambda_j)$  Pigment calculated from the hyperbolic transform of  $L_{i:j}$ .
- $H_{\text{GMT}}$  GMT in hours.
- $H_M$  The measured moon irradiance.
- $H_s$  Altitude of the spacecraft (for SeaStar 705 km).

- I -

- $i$  Inclination angle, interval index, or variable infrared bands (depending on usage).
- $i'$  Inclination angle minus 90°.

- $I$  Rayleigh intensity.
- $I(\lambda)$  Detector current.
- $I_0$  Surface downwelling irradiance.
- $I_1$  Radiant intensity after traversing through an absorbing medium.
- $I_2$  Reflected radiant energy received by the satellite sensor.
- $I_{\max}$  Recorded maximum instrument output in response to linearly polarized light.
- $I_{\min}$  Recorded minimum instrument output in response to linearly polarized light.
- $ICS$  Current from the current source diode.

- J -

- $j$  Interval index, or variable infrared bands (depending on usage).
- $J_2$  The  $J_2$  gravity field term (0.0010863).
- $J_3$  The  $J_3$  gravity field term (-0.0000254).
- $J_4$  The  $J_4$  gravity field term (-0.0000161).
- $J_5$  The  $J_5$  gravity field term.

- K -

- $k$  Wavenumber of light ( $1/\lambda$ ), the fractional factor of total particle scattering, the molecular absorption cross-section area, or an index to two vectors of band ratios  $k_1$  and  $k_2$  (depending on usage).
- $k'$   $y/\tan \theta_{0w}$ .
- $k_1$  Beginning wavenumber, or a band ratio vector (depending on usage).
- $k_2$  Ending wavenumber, or a band ratio vector (depending on usage).
- $k_c$  Wavelength independent fraction.
- $k_c(\lambda)$  Spectral fit coefficient weighted over the SeaWiFS bands;  $k'_c(\lambda)$  also used.
- $k_s$  A constant related to  $a_s$  and  $b_s$ .
- $\bar{K}$  Vector of  $\bar{K}_n$ .
- $K(\lambda)$  Generic irradiance attenuation coefficient.
- $K(z, \lambda)$  Diffuse attenuation coefficient.
- $K(440)$  Diffuse attenuation coefficient of seawater measured at 440 nm.
- $K(490)$  Diffuse attenuation coefficient of seawater measured at 490 nm.
- $K_0(\lambda)$  Diffuse attenuation coefficient at  $z = 0$ .
- $K_1$  Primary instrument sensitivity factor.
- $K_2$  Gain factor.
- $K_3$  Temperature dependence of detector output.
- $K_4$  Scan modulation correction factor.
- $K_5$  Spacecraft analog-to-digital conversion factor.
- $K_6$  Analog-to-digital offset in spacecraft conversion.
- $K_7$  Current from the diode at 20°C.
- $K_c(\lambda)$  Attenuation coefficient for phytoplankton.
- $K_d$  Diffuse attenuation coefficient for downwelling irradiance.
- $K_d(z, \lambda)$  Vertical profile of the diffuse attenuation coefficient for the downwelling irradiance spectrum.
- $K'_d(z, \lambda)$   $K_d(z, \lambda)$  determined by least squares regression over a depth interval.
- $K_E(\lambda)$  Attenuation coefficient downwelled irradiance.
- $K_g(\lambda)$  Attenuation coefficient for Gelbstoff.
- $K_i$  A correction constant at the  $i$ th pixel.
- $K_L(z, \lambda)$  Vertical profile of the diffuse attenuation coefficient for the upwelling radiance spectrum.

$K'_L(z, \lambda)$	$K_L(z, \lambda)$ determined by least squares regression over a depth interval.	$L_s(\lambda)$	Subsurface water radiance.
$\bar{K}_n$	$K$ at node depth $z_n$ determined, with its vertical derivative by least-squares fit to radiometric profiles.	$L_{sa}$	$L_0 + L_{sfc}$ .
$K_s(z, \lambda')$	Apparent attenuation coefficient measured in a homogenous water column.	$L_{sat}(\lambda)$	Saturation radiance for the sensor.
$K_u(z, \lambda)$	Vertical attenuation coefficient for upwelled irradiance.	$L_{scan}$	Measured radiance at any pixel in a scan.
$K'_u(z, \lambda)$	$K_u(z, \lambda)$ determined by least squares regression over a depth interval.	$L_{sfc}$	The radiance of the light reflected from the sea surface.
$K_w(\lambda)$	Attenuation coefficient for pure seawater.	$L_{sfc}$	The columnar matrix of the four Stokes parameters ( $L_{u,1}, L_{u,2}, L_{u,3}, L_{u,4}$ ).
$KPUR$	A temperature-dependent variable in the productivity model of Morel (1991) that defines the shape of the photosynthesis-irradiance relationship.	$L_{sky}(\lambda)$	Spectral sky radiance distribution.
- L -		$L_t(\lambda)$	Total radiance at the top of the atmosphere (where a satellite sensor is located).
$l$	Cuvette pathlength.	$L_{top}$	Radiance emerging at the top of the atmosphere.
$l_s$	Nominal absorption pathlength.	$L_{typical}$	Expected radiance from the ocean measured on orbit.
$L$	Radiance of light transmitted through absorbing oxygen.	$L_u(z, \lambda)$	Upwelling spectral radiance profile.
$L(0, 0)$	Spectral radiance measured at the point closest to the center of a sphere.	$L_u(0^-, \lambda)$	Upwelling spectral radiance just beneath the sea surface.
$L(411.5)$	Spectral radiance at 411.5 nm.	$\hat{L}_u(\lambda)$	True upwelled spectral radiance.
$L(532)$	Spectral radiance at 532 nm.	$\tilde{L}_u(\lambda)$	Measured upwelled spectral radiance.
$L(z, \theta, \phi)$	Submerged upwelled radiance.	$L_{up}$	The columnar matrix of light leaving the surface containing the values $L_{up,1}, L_{up,2}, L_{up,3}$ , and $L_{up,4}$ .
$L(\lambda)$	Spectral radiance.	$L_{up,i}$	The RADTRAN radiance parameters (for $i = 1, 4$ ).
$L(\lambda_m)$	The radiance of a calibration sphere at the nominal peak wavelength of a filter.	$L_w$	The scalar value of the water-leaving radiance multiplied by a columnar matrix of the four Stokes parameters.
$L(\lambda, \theta, \phi)$	Atmospheric path radiance at flight altitude.	$L_w$	The water-leaving radiance of light scattered from beneath the surface and penetrating it.
$L_0$	The radiance of the atmosphere.	$L_w(443)$	Water-leaving radiance at 443 nm.
$L_1(\lambda)$	Apparent radiance response to a linearly polarized source.	$L_w(520)$	Water-leaving radiance at 520 nm.
$L_2(\lambda)$	Orthogonal apparent radiance response to a linearly polarized source.	$L_w(550)$	Water-leaving radiance at 550 nm.
$L_a$	Atmospheric path radiance due to aerosols.	$L_w(670)$	Water-leaving radiance at 670 nm.
$L_{atm}$	Radiance of light reflected from the atmosphere.	$L'_{WN}$	Normalized water-leaving radiance at the Raman excitation wavelength.
$L_c(\lambda)$	Cloud radiance threshold.	$L_{WN}(\lambda)$	Normalized water-leaving radiance.
$L_{cal}$	Calibration source radiance.	$LS_1$	Measured radiance for mirror side 1.
$L_{cloud}$	The maximum radiance from reflected light off of clouds.	$LS_2$	Measured radiance for mirror side 2.
$L_d$	A matrix of the four Stokes parameters for radiance incident on the surface.	- M -	
$L_g(\lambda)$	Sun glint radiance.	$m$	Index of refraction, or an air mass (depending on usage).
$L_i$	Incident light, or the length of the $i$ th element (depending on usage).	$M$	Path length through the atmosphere, or the total number of discrete data points in a vertical radiometric profile (depending on usage).
$L_i(\lambda)$	Spectral radiance for run number $i$ , or radiance, where $i$ may represent any of the following: $m$ for measured; $LU$ for look-up table; 0 for light scattered by the atmosphere; $sfc$ for reflection from the sea surface; and $w$ for water-leaving radiance.	$M'_m$	The corrected mean orbit anomaly of the Earth, which is a function of date, and refers to an imaginary moon in a circular orbit.
$L_{i,j}$	The ratio of normalized water-leaving radiances at wavelengths $i$ ( $\lambda_i$ ) to $j$ ( $\lambda_j$ ): $L_{WN}(\lambda_i)/L_{WN}(\lambda_j)$ .	$M_{oz}$	Path length for ozone transmittance.
$L_{LU}$	The radiance calculated for the look-up tables.	- N -	
$L_m$	The radiance of the ocean-atmosphere system measured at a satellite.	$n$	The index of refraction, the mean orbital motion in revolutions per day, the gain setting, or the starting index in a measurement for angular measurements, or node index for the integral $K$ analysis (depending on usage).
$L_M$	The radiance of the moon.	$n(\lambda)$	An exponent conceptually similar to the Ångström exponent.
$L_{max}$	Maximum saturation radiance.	$n_g(\lambda)$	Index of refraction of Plexiglas™.
$L_{nadir}$	Measured radiance at nadir.	$n_w(\lambda)$	Index of refraction of water.
$L_{NER}(\lambda)$	Noise equivalent radiance.	$N$	The total number of something, or the ending index in a measurement sequence for angular measurements, or total number density (depending on usage).
$L_r(\lambda)$	Atmospheric path radiance due to Rayleigh scattering.	$N_D$	The compensation factor for a 4 log neutral density filter.
$L_{r0}(\lambda)$	Rayleigh radiance at standard atmospheric pressure, $P_0$ .	$N_i$	Total number density of either the first or second aerosol model when $i = 1$ or 2, respectively.

SeaWiFS Prelaunch Technical Report Series Final Cumulative Index

- O -

- $\vec{O} \cdot \vec{P} \times \vec{V}$
- $(O_2/N_2)_{ref}$  The referenced amount of  $O_2/N_2$ .
- $(O_2/N_2)_{samp}$  The sampled amount of  $O_2/N_2$ .
- $O_{20}$  OFFI casts 20 m from the ship's stern.
- $OD_b(\lambda)$  Baseline optical density spectrum.
- $OD_s(\lambda)$  Optical density of soluble material (Gelbstoff).
- $OD_p(\lambda)$  Optical density spectra of filtered particles.
- $OD_r(\lambda)$  Optical density reference for filtered or distilled water.
- $OD_t(\lambda)$  Optical density of non-pigmented particulates (trip-ton).

- P -

- $p$  Surface pressure.
- $p_a$  A factor to account for the probability of scattering to the spacecraft for three different paths from the sun.
- $p_a/(4\pi)$  Aerosol albedo of the scattering phase function.
- $pCO_2$  The partial pressure of  $CO_2$ .
- $p_{dev}$  Pressure deviation between the minimum and maximum surface pressures compared to 1,013 mb.
- $p_{ref}$  Reference pressure.
- $p_w$  The probability of seeing sun glitter in the direction  $\theta, \Phi$  given the sun in position  $\theta_0, \Phi_0$  as a function of wind speed ( $W$ ).
- $P$  Nodal period, phaeopigment concentration, local surface pressure, or the particulate concentration including detrital material (depending on usage).
- $\vec{P}$  Orbit position vector.
- $P(\theta^+)$  Phase function for forward scattering.
- $P(\theta^-)$  Phase function for backward scattering.
- $P(\lambda)$  Polarization sensitivity.
- $P_0$  Standard atmospheric pressure (1,013.25 mb).
- $P_a$  Probability of scattering to the spacecraft.
- $P_{edge}$  A pixel located on the exact edge of a bright source in a GAC scene.
- $P_G$  Gross photosynthesis is defined as the number of electrons photochemically produced from the splitting of water.
- $P_i$  PR714 raw radiance, the fitting coefficient for  $i = 1-5$ , or the  $i$ th pixel under correction (depending on usage).
- $P_n$  Net photosynthesis is defined as  $P_G - R_i$ .
- $P_{PC}$  Annual average phytoplankton particulate organic carbon production ( $gC\ m^{-2}\ yr^{-1}$ ).
- $P_S$  Simulated  $C_a + C_P$  (q.v.).
- $P_{slit}$  Designates the number of pixels after the slit for the instrument to return to the residual counts allowed in the specification.
- $P_T$  Depth-integrated primary production.
- $P_W$  Probability of seeing sun glint in the spacecraft direction.
- $P_{xl}$  Pixel number, i.e., the numerical designation of a pixel in a scan line.
- $P_{zero}$  Designates the number of pixels required for the instrument to settle to a level of zero residual counts.
- $P^b(z)$  Chlorophyll-specific photosynthetic rate at depth  $z$ .
- $P_{opt}^b$  Maximum chlorophyll-specific carbon fixation rate within a water column.
- $P^B$  Chlorophyll normalized photosynthesis.
- $P_{max}^B$   $P_{max}$  normalized to chlorophyll concentration.
- $PB_{max}$  Maximum biomass-specific photosynthetic rate.

$PF$  Polarization factor.

$PP$  Primary productivity.

$P_\Delta$  The location of the pixel to be corrected in GAC pixels relative to the (bright target) edge pixel.

$P_\sigma$  Phaeopigment concentration.

- Q -

$q$  Water transmittance factor.

$Q$  The ratio of upwelling irradiance to radiance, which varies with the angular distribution of the upwelling light field, and is  $\pi$  for an isotropic distribution.

$Q(\lambda)$   $L_u(0^-, \lambda)$  to  $E_u(0^-, \lambda)$  relation factor (equal to  $\pi$  for a Lambertian surface).

- R -

$r$  Water-air reflectance for totally diffuse irradiance, the radius coordinate, the Earth-sun distance, or the lamp-to-plaque distance in centimeters (depending on usage).

$r_1$  The radius of circle one, or source aperture (depending on usage).

$r_2$  The radius of circle two, or detector aperture (depending on usage).

$r_i$  The geometric mean radii of either the first or second aerosol model when  $i = 1$  or 2, respectively.

$R$  Reflectance, the linear correlation coefficient, or phytoplankton respiration (depending on usage).

$\bar{R}$  The reflection matrix.

$\bar{R}$  Mean Earth-sun distance.

$R^2$  The square of the linear correlation coefficient.

$R(0^-, \lambda)$  Irradiance reflectance just below the sea surface.

$R(\lambda)$  The irradiance reflectance at a particular wavelength.

$R_1$  A multiplier for mirror side 1.

$R_2$  A multiplier for mirror side 2.

$R_a$  Aerosol reflectance.

$\dot{R}_a$   $R_a/(qT_{2r})$ .

$R_B$  Bidirectional reflectance distribution function.

$R_d$  Dark respiration by the photosynthetic organism.

$R_e$  Mean Earth radius (6,378.137 km).

$R_E$  Effective resistance for the thermistor-resistor pair.

$R_i$  Radiance of the  $i$ th pixel.

$R_l$  All the losses of fixed carbon due to respiratory processes of the photosynthetic organism in the light.

$R'_L$  Reflectance from an uncalibrated radiometer.

$R_L(z, \lambda)$  Spectral reflectance.

$R_{lim}$  Limiting reflectance for defining Case-1 water.

$R_r$  Rayleigh reflectance.

$R_{rs}$  Remote sensing reflectance.

$R_{rs}(z, \lambda)$  Spectral remote sensing reflectance profile.

$R_s$  Subsurface reflectance.

$R_t$  Total reflectance at the sensor.

$\dot{R}_t$   $(R_t - R_r)/(qT_{2r})$ .

$R_T$  Resistance of the thermistor.

$R_z$  Sunspot number.

- S -

$s$  The reflectance of the atmosphere for isotropic radiance incident at its base.

$s(\lambda)$  The slope for the range 0-1,023.

$s_{xy}$  Residual standard deviation.

$S$  The solar constant, or the slope of a line (depending on usage).

$S(\lambda)$	The solar spectral irradiance, or $L_a(\lambda)/L_a(670)$ (depending on usage).	$- U, V -$
$S(\lambda_r)$	A coefficient of water temperature variation in $a_w(\lambda, T)$ .	$V$ Volume of water filtered. $\vec{V}$ Orbit velocity vector.
$S_G(\lambda)$	Radiometer signal (uncalibrated) measured viewing a reflectance plaque.	$\hat{V}$ True voltage. $\tilde{V}$ Measured voltage.
$S_i$	Initial detector signal.	$V(z)$ Transmissometer voltage.
$S_n$	Detector signal with gain.	$V(\theta)$ Normalized measured value for a cosine collector.
$S_{sky}$	Radiometer signal (uncalibrated) measured viewing the sky.	$V(\theta_i)$ Mean normalized measured value of instrument response.
$S_w(\lambda)$	Radiometer signal (uncalibrated) measured viewing the water.	$V_{air}$ Factory transmissometer air calibration voltage. $V'_{air}$ Current transmissometer air calibration voltage. $V_{dark}$ Transmissometer dark response.
$- T -$		
$t$	Time variable, or the transmission of $L_{sfc}$ through the atmosphere (depending on usage).	$V_i(t_j)$ The $i$ th spatial location at observation time $t_j$ .
$t'$	The transmission of $L_W$ through the atmosphere.	$V_M$ The radiance detector voltage while viewing the moon.
$t(k)$	Spectral transmission as a function of wavenumber.	$V_S$ The irradiance detector voltage while viewing the sun.
$t(\lambda)$	Diffuse transmittance of the atmosphere.	$V_T$ Focal plane temperature sensor voltage output.
$t(750, \theta)$	Diffuse transmittance between the ocean surface and the sensor at 750 nm.	
$t_0$	Initial time, or the sum of the direct and diffuse transmission of sunlight through the atmosphere (depending on usage).	
$t_1$	First observation time.	
$t_2$	Second observation time.	
$t_a$	Aerosol transmittance after absorption.	
$t_{as}$	Aerosol transmittance after scattering.	
$t_d$	Direct component of transmittance after absorption by the gaseous components of the atmosphere, scattering and absorption by aerosols, and scattering by Rayleigh.	
$t_d(z, \lambda)$	Downward spectral irradiance transmittance from flight altitude $z$ to the surface.	
$t_e$	Time difference in hours between present position and most recent equator crossing.	
$t_{EC}$	Equator crossing time.	
$t_{os}$	Transmittance after absorption by ozone.	
$t_r$	Transmittance after Rayleigh scattering.	
$t_s$	Diffuse component of transmittance after absorption by the gaseous components of the atmosphere, scattering and absorption by aerosols, and scattering by Rayleigh.	
$t_{wv}$	Transmittance after absorption by water vapor.	
$T$	Tilt position.	
$T'$	Instrument temperature during calibration.	
$T^\circ$	Levitus climatological median upper ocean temperature ( $18.1^\circ\text{C}$ ) as computed by Antoine et al. (1996).	
$T(\lambda)$	The transmittance along the slant path to the sun.	
$T(\lambda, \theta)$	Total transmittance (direct plus diffuse) from the ocean through the atmosphere to the spacecraft along the path determined by the spacecraft zenith angle $\theta$ .	
$T(\lambda, \theta, \theta_0)$	Two-way transmission through oxygen in the model layer in terms of zenith angle ( $\theta$ ), and solar angle ( $\theta_0$ ).	
$T_0(\lambda, \theta_0)$	Total downward transmittance of irradiance.	
$T_{2r}$	Two-way diffuse transmittance for Rayleigh attenuation.	
$T_e$	Equation of time.	
$T_g(\lambda)$	Transmittance through a glass window.	
$T_{ox}$	Transmittance of oxygen ( $\text{O}_2$ ).	
$T_{oz}$	Transmittance of ozone ( $\text{O}_3$ ).	
$T_s(\lambda)$	Transmittance through the surface.	
$T_w(\lambda)$	Transmittance through a water path.	
$T_{wv}$	Transmittance of water vapor ( $\text{H}_2\text{O}$ ).	
$- W -$		
$w_m$	The weighting coefficient at each depth $z_m$ .	
$W$	Wind speed, or equivalent bandwidth (depending on usage).	
$W_d$	Direct irradiance divided by the total irradiance at the surface.	
$W_s$	Diffuse irradiance divided by the total irradiance.	
$W_\theta$	Weighting function.	
$- X -$		
$x$	The abscissa or longitudinal coordinate, or the pixel number within a scan line (depending on usage).	
$X$	ECEF $x$ component of orbit position, or depth in meters (depending on usage).	
$\dot{X}$	ECEF $X$ component of orbit velocity.	
$- Y -$		
$y$	The ordinate, meridional coordinate, or an empirical factor (depending on usage).	
$Y$	ECEF $y$ component of orbit position; or the base 10 logarithm of the radiometric measurement $E_d$ , $E_u$ , or $L_u$ (depending on usage).	
$\dot{Y}$	ECEF $Y$ component of orbit velocity.	
$- Z -$		
$z$	The vertical coordinate (frequently water depth).	
$z'$	Corrected depth for pressure transducer depth offset relative to a sensor.	
$z_{eu}$	Depth of the euphotic zone.	
$z_i$	The depth of a particular node.	
$z_m$	Centered depth, or the depth of the $m$ th data point in a vertical radiometric profile (depending on usage).	
$z_n$	The node depth number ( $n = 0, \dots, N - 1$ ).	
$z_r$	Shallow depth.	
$z_s$	Exclusion depth due to data contamination.	
$Z$	ECEF $z$ component of orbit position, or a substrate (depending on usage).	
$\dot{Z}$	ECEF $Z$ component of orbit velocity.	
$- OTHER -$		
* Normalization-to-chlorophyll concentration.		

- GREEK -

$\alpha$	Percent albedo, tilt angle, formulation coefficient (intercept), the power constant in the Ångström formulation, the exponential value in the expression relating the extinction coefficient to wavelength, the off-axis angle, or the light-limited slope of the photosynthesis-irradiance relationship (depending on usage).	chlorophyll population which are capable of photosynthesis.
$\alpha'$	A power law constant.	$\Delta\omega$ The longitude difference from the subsatellite point to the pixel.
$\alpha^*(\lambda)$	Chlorophyll-specific, spectral absorption coefficient for phytoplankton.	$\Delta\omega_s$ Longitude difference.
$\alpha_0$	A curve fitting constant.	$\epsilon$ Cosine collector response error or an atmospheric correction parameter (depending on usage).
$\alpha_1$	A curve fitting constant.	$\epsilon(i, j)$ The ratio of $L_a$ in two bands $i$ and $j$ .
$\alpha_2$	A curve fitting constant.	$\epsilon_{sky}$ Self-shading error for $E_{sky}$ .
$\alpha_{750}$	Albedo at 750 nm.	$\epsilon_{sun}$ Self-shading error for $E_{sun}$ .
$\alpha^B$	Chlorophyll normalized $\alpha$ .	$\epsilon(\lambda) = 1 - e^{-k' \alpha(\lambda) r}$
$\beta$	A formulation coefficient (slope), a constant in the Ångström formulation, or the correction method for pathlength amplification (depending on usage).	$\eta$ The bearing from the sub-satellite point to the pixel along the direction of motion of the satellite.
$\beta(z, \lambda, \theta)$	Spectral volume scattering function.	$\theta$ The spacecraft zenith angle, spacecraft pitch, the polar angle of the line-of-sight at a spacecraft, the centroid angle of the scattering measurement, or a generalized angle (depending on usage).
$\tilde{\beta}(\theta)$	The normalized scattering phase function $(\beta(\theta)/b)$ .	$\dot{\theta}$ Pitch rate.
$\tilde{\beta}_b$	The measured integral of the volume scattering function in the backward direction.	$\theta_0$ Polar angle of the direct sunlight, or solar zenith angle (depending on usage).
$\beta_i$	The extinction coefficient of either the first or second aerosol model when $i = 1$ or 2, respectively; or the filter absorption correction factor for scattering within the filter.	$\theta_{0w}$ Refracted solar zenith angle.
$\gamma$	The Ångström exponent.	$\theta_1$ The intersection angle of circle one or the lower integration limit (depending on usage).
$\gamma(\lambda)$	The ratio of the aerosol optical thickness at wavelength $\lambda$ to the aerosol optical thickness at 670 nm.	$\theta_2$ The intersection angle of circle two or the upper integration limit (depending on usage).
$\gamma_{ij}(\xi)$	Hermitian cubic polynomial.	$\theta_a$ In-air measurement angle.
$\delta$	The great circle distance from $\Psi_s(t_0)$ to $\Psi_s(t - t_0)$ , the departure of each individual conversion factor from the mean, a relative difference, the absorption coefficient, or the cosine response asymmetry (depending on usage).	$\theta_i$ Any nominal angle.
$\Delta k$	Equivalent bandwidth.	$\theta_n$ The zenith angle of the vector normal to the surface vector for which glint will be observed, or an angular origin (depending on usage).
$\Delta L$	The difference between $L$ and $L_0$ .	$\theta_N$ The angle with respect to nadir that the sea surface slopes to produce a reflection angle to the spacecraft or an angular terminus (depending on usage).
$\Delta L_W(670)$	The error in the water-leaving radiance for the red channel.	$\theta_s$ Scan angle of sensor or the solar zenith angle (depending on usage).
$\delta(O_2:N_2)_{GLOB}$	The changes in the global O <sub>2</sub> :N <sub>2</sub> .	$\theta'_s$ Scan angle of sensor adjusted for tilt.
$\Delta p$	The difference in atmospheric pressure.	$\theta_t$ Tilt angle.
$\Delta p_{CO_2}$	The difference in the partial pressure of CO <sub>2</sub> in the air and in the sea.	$\theta_w$ In-water measurement angle.
$\Delta P$	The difference in successive pixels, or the pressure deviation from standard pressure, $P_0$ (depending on usage).	$\kappa$ An integration constant: $\kappa = A_d \pi r_i^2 (r_1^2 + r_2^2 + d^2)^{-1}$ .
$\Delta t$	Time difference.	$\kappa'$ Self-shading coefficients.
$\Delta T$	Changes in temperature.	$\lambda$ Wavelength of light.
$\Delta T(\lambda)$	The error in transmittance.	$\lambda'$ A channel of nominal wavelength, or the Raman excitation wavelength (depending on usage).
$\Delta z$	Half-interval depth increment.	$\lambda_0$ Center wavelength.
$\Delta\theta$	Angular increment.	$\lambda_1$ Starting wavelength.
$\Delta\theta_s$	The error (in radians) in the knowledge of $\theta_s$ .	$\lambda_2$ Ending wavelength.
$\Delta\lambda$	An interval in wavelength.	$\lambda_i$ A wavelength of light at a particular band.
$\Delta\rho_w(\lambda)$	The error in the water-leaving reflectance for the red channel.	$\lambda_j$ A wavelength of light at a particular band.
$\Delta\sigma(\lambda)$	The absolute error in spectral optical depth.	$\lambda_m$ Nominal center wavelength.
$\Delta\tau_a$	The error in the aerosol optical thickness.	$\lambda_n$ Any nominal wavelength.
$\Delta\Phi_{max}$	The ratio $F_v/F_m$ which corresponds to the (normalized) maximum number of reaction centers in the	$\lambda_r$ Near-IR wavelength.
		$\mu$ Mean value, or cosine of the satellite zenith angle (depending on usage).
		$\mu_0$ Cosine of the solar zenith angle.
		$\bar{\mu}_d(z, \lambda)$ Spectral mean cosine for downwelling radiance at depth $z$ .
		$\bar{\mu}_d(0^+, \lambda)$ Spectral mean cosine for downwelling radiance at the sea surface.
		$\mu_s$ The reciprocal of the effective optical length to the top of the atmosphere, along the line of sight to the sun.

$\nu_j$	The $j$ th temporal weighting factor.	$\tau_a$	Aerosol optical thickness.
$\xi$	A local depth coordinate ranging from $-1$ at node $z_{i-1}$ to $+1$ at node $z_i$ , or actual deployment distance (depending on usage).	$\tau_g(\lambda)$	Uniform mixed gas optical thickness.
$\xi(\lambda)$	Minimum ship-shadow avoidance distance.	$\tau_o(\lambda)$	Ozone optical thickness.
$\xi_d$	The calculated deployment distance for downwelling irradiance measurements.	$\tau_{ox}$	Oxygen optical thickness at 750 nm.
$\xi_M$	The distance between the Earth and the moon.	$\tau_{ox}(\lambda)$	Optical thickness due to oxygen absorption.
$\xi_L$	The calculated deployment distance for upwelling radiance measurements.	$\tau_{oz}$	The optical thickness of ozone.
$\xi_u$	The calculated deployment distance for upwelling irradiance measurements.	$\tau_r$	Rayleigh optical thickness (due to scattering by the standard molecular atmosphere).
II Depth-integrated primary production.		$\tau'_r$	Pressure corrected Rayleigh optical thickness.
$\rho$	The Fresnel reflectivity, the weighted direct plus diffuse reflectance, or the average reflectance of the sea (depending on usage).	$\tau_R(\lambda)$	Rayleigh optical thickness.
$\tilde{\rho}$	The Fresnel reflectance for sun and sky irradiance.	$\tau_{ro}$	Rayleigh optical thickness at standard atmospheric pressure, $P_0$ .
$\rho(\theta)$	Fresnel reflectance for viewing geometry.	$\tau_{ro}$	Rayleigh optical thickness weighted by the SeaWiFS spectral response.
$\rho(\theta_0)$	Fresnel reflectance for solar geometry.	$\tau_s(\lambda)$	Spectral solar atmospheric transmission.
$\rho(\lambda)$	The bidirectional reflectance.	$\tau_{vv}$	The absorption optical thickness of water vapor.
$\rho_{c,i}$	Reflectance of clouds and ice.	$\tau_{wv}(\lambda)$	Water vapor optical thickness.
$\rho_g(\lambda)$	Gray card or plaque reflectance.		
$\rho_i$	The reflectance of the sea of either the first or second aerosol model when $i = 1$ or $2$ , respectively.	$\phi$	Azimuth angle of the line-of-sight at a spacecraft.
$\rho_i(\lambda)$	The reflectance where $i$ may represent any of the following: $m$ for measured; $LU$ for look-up table; $o$ for light scattered by the atmosphere; $sfc$ for reflection from the sea surface; or $w$ for water-leaving radiance.	$\phi_0$	Azimuth angle of the direct sunlight.
$\rho_n$	Sea surface reflectance for direct irradiance at normal incidence for a flat sea.	$\Phi$	Spacecraft azimuth angle or roll (depending on usage).
$\rho_N$	Reflectance for diffuse irradiance.	$\Phi$	A photoadaptive variable which is a chlorophyll-specific quantum yield for absorbed PAR.
$\sigma$	One standard deviation of a set of data values.	$\dot{\Phi}$	Roll rate.
$\sigma^2$	The mean square surface slope distribution.	$\Phi_0$	Solar azimuth angle.
$\sigma(\lambda)$	The spectral optical depth.	$\Phi_D$	The detector solid angle.
$\sigma_i^2$	$\sigma_i^2 = (\log r - \log r_i)^2$ .	$\Phi_M$	The solid angle subtended by the moon at the measuring instrument.
$\Sigma PP$	Classification system for primary productivity models based on implicit levels of integration.	$\varphi$	A photoadaptive variable which is a chlorophyll-specific quantum yield for available PAR.
$\sigma_t$	The density of sea water determined from the <i>in situ</i> salinity and temperature, but at atmospheric pressure.	$\chi$	Proportionality constant.
$\sigma_\theta$	The density of sea water determined from the <i>in situ</i> salinity and the potential temperature ( $\theta$ ), but at atmospheric pressure.	$\Psi$	The pixel latitude, yaw, or the ratio of depth-integrated primary production to the product of depth-integrated chlorophyll $a$ and time-integrated radiant energy [ $\text{gC(gChl)}^{-1} \text{Ein}^{-1} \text{m}^{-2}$ ] (depending on usage).
$\vec{r}$	Vector of measured optical depths.	$\dot{\Psi}$	Yaw rate.
$\tau(z, \lambda)$	Vertical profile of the spectral optical depth.	$\Psi_d$	Solar declination latitude.
$\hat{\tau}(z, \lambda)$	The estimated vertical profile of the spectral optical depth.	$\Psi_s(t)$	Subsatellite latitude as a function of time.
		$\omega$	Longitude variable, the surface reflection angle, or the single scattering albedo (depending on usage).
		$\omega_0$	Old longitude value.
		$\omega_a$	Single scattering albedo of the aerosol.
		$\omega_e$	Equator crossing longitude.
		$\omega_i$	Spatial weighting factor.
		$\omega_s$	Longitude variable.
		$\Omega$	Solar hour angle, or the amount of ozone in Dobson units (depending on usage).

## REFERENCES

- A -

- Abbott, M.R., and P.M. Zion, 1985: Satellite observations of phytoplankton variability during an upwelling event. *Cont. Shelf Res.*, **4**, 661–680.
- , and D.B. Chelton, 1991: Advances in passive remote sensing of the ocean. *U.S. National Report to the International Union of Geodesy and Geophysics 1987–1990, Contributions in Oceanography*, Am. Geophys. Union, Washington, DC, 571–589.
- Abel, P., G.R. Smith, R.H. Levin, and H. Jacobowitz, 1988: Results from aircraft measurements over White Sands, New Mexico, to calibrate the visible channels of spacecraft instruments. *SPIE*, **924**, 208–214.
- , B. Guenther, R. Galimore, and J. Cooper, 1993: Calibration results for NOAA-11 AVHRR channels 1 and 2 from congruent aircraft observations. *J. Atmos. and Ocean. Technol.*, **10**, 493–508.
- Ackleson S.G., and P.M. Holligan, 1989: AVHRR observations of a Gulf of Maine coccolithophorid bloom. *Photogramm. Eng. Remote Sens.*, **55**, 473–474.
- Ahmad, Z., and R.S. Fraser, 1982: An iterative radiative transfer code for ocean-atmosphere systems. *J. Atmos. Sci.*, **39**, 656–665.
- Aiken, J., 1981: A chlorophyll sensor for automatic, remote operation in the marine environment. *Mar. Ecol. Prog. Ser.*, **4**, 235–239.
- , 1985: The Undulating Oceanographic Recorder Mark 2. A multirole oceanographic sampler for mapping and modelling the biophysical marine environment. In: *Mapping Strategies in Chemical Oceanography*, A. Zirino, Ed., American Chemical Society, **209**, 315–332.
- , and I. Bellan, 1990: Optical Oceanography: an assessment of towed measurement. In: *Light and Life in the Sea*, P.J. Herring, A.K. Campbell, M. Whitfield, and L. Maddock, Eds., Cambridge University Press, 39–57.
- , G.F. Moore, and P.M. Holligan, 1992: Remote sensing of oceanic biology in relation to global climate change. *J. Phycol.*, **28**, 579–590.
- , and —, 1995: Special requirements for the validation of ocean colour information. Proceedings of the WMO/IOC Conference on Space-Based Ocean Observation, *WMO/PD-No. 649*, 93–101.
- , —, C.C. Trees, S.B. Hooker, and D.K. Clark, 1995: The SeaWiFS CZCS-Type Pigment Algorithm. *NASA Tech. Memo. 104566, Vol. 29*, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 34 pp.
- Aitchison, J., and J.A.C. Brown, 1957: *The Lognormal Distribution*. Cambridge University Press, 176 pp.
- Allen, C.W., 1973: *Astrophysical Quantities, 3rd Edition*. Athalone Press London, 310 pp.
- Andersen J.H., 1991: CZCS level-2 generation. *OCEAN Technical Series, Nos. 1–8, Ocean Colour European Archive Network*, 49 pp.
- Anderson, R.F., 1992: Southern Ocean processes study. *U.S. JGOFS Planning Report Number 16*, Woods Hole Oceanographic Institution, Woods Hole, Massachusetts, 114 pp.
- Andersen, R.A., R.R. Bidigare, M.D. Keller, and M. Latasa, 1996: A comparison of HPLC pigment signatures and electron microscopic observations for oligotrophic waters of the North Atlantic and Pacific Oceans. *Deep-Sea Res.*, **43**, 517–537.
- André, J.-M. and A. Morel, 1989: Simulated effects of barometric pressure and ozone content upon the estimate of marine phytoplankton from space. *J. Geophys. Res.*, **94**, 1,029–1,037.
- , and —, 1991: Atmospheric corrections and interpretation of marine radiances in CZCS imagery, revisited. *Oceanol. Acta*, **14**, 3–22.
- Ångström, A., 1964: The parameters of atmospheric turbidity. *Tellus*, **16**, 64–75.
- Antoine, D., J.-M. André, and A. Morel, 1996: Oceanic primary production 2. Estimation at global scale from satellite (Coastal Zone Color Scanner) chlorophyll. *Global Biogeochem. Cycles*, **10**, 57–69.
- Arking, A., and J.D. Childs, 1985: Retrieval of cloud cover parameters from multispectral satellite images. *J. Climate Appl. Meteor.*, **24**, 322–333.
- Arrigo, K.R., C.R. McClain, J.K. Firestone, C.W. Sullivan, and J.C. Comiso, 1994: "Comparison of CZCS and *in situ* pigment concentrations in the Southern Ocean." In: *Case Studies for SeaWiFS Calibration and Validation, Part 1. NASA Tech. Memo. 104566, Vol. 19*, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 30–34.
- , and C.R. McClain, 1995: "Cloud and ice detection at high latitudes for processing of CZCS imagery." In: *McClain, C.R., W.E. Esaias, M. Darzi, F.S. Patt, R.H. Evans, J.W. Brown, K.R. Arrigo, C.W. Brown, R.A. Barnes, and L. Kumar: Case Studies for SeaWiFS Calibration and Validation, Part 4. NASA Tech. Memo. 104566, Vol. 28*, S.B. Hooker, E.R. Firestone, and J.G. Acker, Eds., NASA Goddard Space Flight Center, 8–12.
- Arthur, M.A., D. Allard, and K.R. Hinga, 1991: Cretaceous and Cenozoic atmospheric carbon dioxide variations and past global climate change. *Geol. Soc. Am. Ann. Meeting, Abstr.* A:178.
- Austin, R.W., 1974: The remote sensing of spectral radiance from below the ocean surface. *Optical Aspects of Oceanography*, N.G. Jerlov and E. Steemann-Nielsen, Eds., Academic Press, 317–344.
- , 1976: Air-Water Radiance Calibration Factor. *Tech. Memo. ML-76-004t*, Vis. Lab., Scripps Institution of Oceanography, La Jolla, California, 8 pp.
- , 1980: Gulf of Mexico, ocean-color surface-truth measurements. *Bound.-Layer Meteor.*, **18**, 269–285.
- , 1993: Optical remote sensing of the oceans: BC (Before CZCS) and AC (After CZCS). *Ocean Colour: Theory and Applications in a Decade of CZCS Experience*, V. Barale and P. Schlittenhardt, Eds., ECSC, EEC, EAEC, Brussels and Luxembourg, Kluwer Academic Publishers, Norwell, Massachusetts, 1–15.

- , and T.J. Petzold, 1975: An instrument for the measurement of spectral attenuation coefficient and narrow-angle volume scattering function of ocean waters. *Visibility Laboratory of the Scripps Institution of Oceanography Report, SIO Ref. 75-25*, La Jolla, California, 12 pp.
- , and G. Halikas, 1976: The index of refraction of seawater. *SIO Ref. 76-1*, Vis. Lab., Scripps Institution of Oceanography, La Jolla, California, 64 pp.
- , and T.J. Petzold, 1981: The determination of diffuse attenuation coefficient of sea water using the Coastal Zone Color Scanner. *Oceanography from Space*, J.F.R. Gower, Ed., Plenum Press, 239–256.
- , and B.L. McGlamery, 1983: Passive remote sensing of ocean optical propagation parameters. *32nd Symp., AGARD Electromagnetic Wave Propagation Panel on Propagation Factors Affecting Remote Sensing by Radio Waves*, Oberammergau, Germany, 45-1–45-10.
- B —
- Baker, K.S., and R.C. Smith, 1982: Bio-optical classification and model of natural waters, 2. *Limnol. Oceanogr.*, **27**, 500–509.
- , and —, 1990: Irradiance transmittance through the air/water interface. *Ocean Optics X*, R.W. Spinrad, Ed., SPIE, **1302**, 556–565.
- Baker, M.A., and C.H. Gibson, 1987: Sampling turbulence in the stratified ocean: statistical consequences of strong intermittency. *J. of Phys. Oceanogr.*, **17**, 1,817–1,836.
- Balch, W.M., 1993: Reply. *J. Geophys. Res.*, **98**, 16,585–16,587.
- , M.R. Abbott, and R.W. Eppley, 1989: Remote sensing of primary production—I: A comparison of empirical and semi-analytical algorithms. *Deep-Sea Res.*, **36**, 281–295.
- , P.M. Holligan, S.G. Ackleson, and K.J. Voss, 1991: Biological and optical properties of mesoscale coccolithophore blooms in the Gulf of Maine. *Limnol. Oceanogr.*, **36**, 629–643.
- , R. Evans, J. Brown, G. Feldman, C. McClain, and W. Esaias, 1992a: The remote sensing of ocean primary productivity—use of a new data compilation to test satellite algorithms. *J. Geophys. Res.*, **97**, 2,279–2,293.
- , P.M. Holligan, K.A. Kilpatrick, 1992b: Calcification, photosynthesis and growth of the bloom-forming coccolithophore *Emiliania huxleyi*. *Contin. Shelf Res.*, **12**, 1,353–1,374.
- Bale, A.J., M.D. Toucher, R. Weaver, S.J. Hudson, and J. Aiken, 1994: Laboratory measurements of the spectral properties of estuarine suspended particles. *Neth. J. Aquat. Ecol.*, **28**, 237–244.
- Ball Aerospace Systems Division, 1979: Development of the Coastal Zone Color Scanner for Nimbus-7, Test and Performance Data. *Final Report F78-11, Rev. A, Vol. 2*, Boulder, Colorado, 94 pp.
- Bannister, T.T., 1974: Production equations in terms of chlorophyll concentration, quantum yield, and upper limit to production. *Limnol. Oceanogr.*, **19**, 1–12.
- Barale, V., C.R. McClain, and P. Malanotte-Rizzoli, 1986: Space and time variability of the surface color field in the northern Adriatic Sea. *J. Geophys. Res.*, **91**, 12,957–12,974.
- , and R. Wittenburg-Fay, 1986: Variability of the ocean surface color field in central California near-coastal waters as observed in seasonal analysis of CZCS imagery. *J. Mar. Res.*, **44**, 291–316.
- Barber, R.T., P. Sanderson, S.T. Lindley, F. Chai, J. Newton, C.C. Trees, D.G. Foley, F.P. Chavez, 1996: Primary productivity and its regulation in the equatorial Pacific during and following the 1991–92 El Niño. *Deep-Sea Res.*, **II 43**, 933–969.
- , and P. Schlittenhardt, 1993: *Ocean Colour: Theory and Applications in a Decade of CZCS Experience*, ECSC, EEC, EAEC, Brussels and Luxembourg, Kluwer Academic Publishers, Norwell, Massachusetts, 367 pp.
- Barnes, R.A., 1994: *SeaWiFS Data: Actual and Simulated*. [World Wide Web page.] From URLs: <http://seawifs.gsfc.nasa.gov/SEAWIFS/IMAGES/spectral1.dat> and [/spectral2.dat](http://seawifs.gsfc.nasa.gov/SEAWIFS/IMAGES/spectral2.dat) NASA Goddard Space Flight Center, Greenbelt, Maryland.
- , and A.W. Holmes, 1993: Overview of the SeaWiFS Ocean Sensor. *Proc. SPIE*, **1,939**, 224–232.
- , W.L. Barnes, W.E. Esaias, and C.L. McClain, 1994a: Prelaunch Acceptance Report for the SeaWiFS Radiometer. *NASA Tech. Memo. 104566*, Vol. 22, S.B. Hooker, E.R. Firestone, and J.G. Acker, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 32 pp.
- , A.W. Holmes, W.L. Barnes, W.E. Esaias, and C.R. McClain, 1994b: The SeaWiFS Prelaunch Radiometric Calibration and Spectral Characterization. *NASA Tech. Memo. 104566*, Vol. 23, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 55 pp.
- Berger, W.H., V.S. Smetacek, and G. Wefer, Eds., 1989: *Productivity of the Ocean: Present and Past*. John Wiley & Sons, 471 pp.
- Behrenfeld, M.J., and P.G. Falkowski, 1997a: A consumers guide to primary productivity models. *Limnol. Oceanogr.*, **42**, 1,479–1,491.
- , and —, 1997b: Photosynthetic rates derived from satellite-based chlorophyll concentration. *Limnol. Oceanogr.*, **42**, 1–20.
- Berk, A., L.S. Bernstein, and D.C. Robertson, 1989: MODTRAN: A moderate resolution model for LOWTRAN 7. *GL-TR-89-0122*, Geophysics Laboratory, Air Force Systems Command, 38 pp.
- Berner, R.A., 1991: A model for atmospheric CO<sub>2</sub> over the phanerozoic. *Am. J. Sci.*, **291**, 339–376.
- , 1992: Paleo CO<sub>2</sub> and climate. *Nature*, **358**, 114.
- , 1993: Palaeozoic atmospheric CO<sub>2</sub>: importance of ocean radiation and plant evolution. *Science*, **261**, 68–70.
- Bernstein, R.L., 1982: Sea surface temperature estimation using the NOAA-6 satellite Advanced Very High Resolution Radiometer. *J. Geophys. Res.*, **87**, 9,455–9,465.
- Bidigare, R.R., 1991: Analysis of algal chlorophylls and carotenoids. In: *Marine Particles: Analysis and Characterization*, D.C. Hurd and D.W. Spencer, Eds., Am. Geophys. Union, Washington, DC, 119–123.

SeaWiFS Prelaunch Technical Report Series Final Cumulative Index

- , M.E. Ondrusek, J.H. Morrow, and D.A. Kiefer, 1990: *In vivo absorption properties of algal pigments*. *SPIE Ocean Optics*, **1302**, 290–302.
- , B.B. Prezelin, and R.C. Smith, 1992: Bio-optical models and the problems of scaling. In: *Primary Productivity and Biogeochemical Cycles in the Sea*. P.G. Falkowski and A.D. Woodhead, Eds., Plenum Press, New York, 175–212.
- , and M.E. Ondrusek, 1996: Spatial and temporal variability of phytoplankton pigment distributions in the central equatorial Pacific Ocean. *Deep-Sea Res.*, **43**, 809–833.
- Biggar, S.F., D.I. Gellman, and P.N. Slater, 1990: Improved evaluation of optical depth components from Langley plot data. *Remote Sens. Environ.*, **32**, 91–101.
- , P.N. Slater, K.J. Thome, A.W. Holmes, and R.A. Barnes, 1993: Preflight solar-based calibration of SeaWiFS. *Proc. SPIE*, Vol. 1,999, 233–242.
- Bird, R.E., and C. Riordan, 1986: Simple solar spectral model for direct and diffuse irradiance on horizontal and tilted planes at the Earth's surface for cloudless atmospheres. *J. of Climate and Appl. Meteor.*, **25**, 87–97.
- Blankenship, R.E., 1992: Origin and early evolution of photosynthesis. *Photosyn. Res.*, **33**, 91–111.
- Booth, C.R.B., and R.C. Smith, 1988: Moorabie spectroradiometer in the Biowatt Experiment. *Ocean Optics IX*, SPIE **925**, 176–188.
- Bowman, K.P., and A.J. Krueger, 1985: A global climatology of total ozone from the Nimbus 7 Total Ozone Mapping Spectrometer. *J. Geophys. Res.*, **90**, 7,967–7,976.
- Boyd, R.A., 1951: The development of prismatic glass block and the daylight laboratory. *Eng. Res. Bull. No. 32*, Eng. Res. Inst., Univ. of Mich., Ann Arbor, Michigan, 88 pp.
- Brewer, P.G., and J.P. Riley, 1965: The automatic determination of nitrate in sea water. *Deep-Sea Res.*, **12**, 765–772.
- Bricaud, A., A. Morel, and L. Prieur, 1981: Absorption by dissolved organic matter of the sea (yellow substance) in the UV and visible domains. *Limnol. Oceanogr.*, **26**, 43–53.
- , and —, 1987: Atmospheric corrections and interpretation of marine radiances in CZCS imagery: use of a reflectance model. *Oceanol. Acta*, **7**, 33–50.
- Brock, J.C., C.R. McClain, M.E. Luther, and W.W. Hay, 1991: The phytoplankton bloom in the northwest Arabian Sea during the southwest monsoon of 1979. *J. Geophys. Res.*, **96**, 20,623–20,642.
- , and —, 1992: Interannual variability in phytoplankton blooms observed in the northwestern Arabian Sea during the southwest monsoon. *J. Geophys. Res.*, **97**, 733–750.
- Brouwer, D., 1959: Solution of the problem of artificial satellite theory without drag. *Astron. J.*, **64**(1274), 378–397.
- Brown, C.W., 1995: "Classification of coccolithophore blooms in ocean color imagery." In: McClain, C.R., W.E. Esaias, M. Darzi, F.S. Patt, R.H. Evans, J.W. Brown, K.R. Arrigo, C.W. Brown, R.A. Barnes, and L. Kumar: Case Studies for SeaWiFS Calibration and Validation, Part 4. *NASA Tech. Memo. 104566*, Vol. 28, S.B. Hooker, E.R. Firestone, and J.G. Acker, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 13–19.
- , and J.A. Yoder, 1994a: Coccolithophorid blooms in the global ocean. *J. Geophys. Res.*, **99**, 7,467–7,482.
- , and —, 1994b: Distribution pattern of coccolithophorid blooms in the western North Atlantic. *Cont. Shelf Res.*, **14**, 175–198.
- Brown, O.B., and R.H. Evans, 1985: Calibration of Advanced Very High Resolution Radiometer infrared observations. *J. Geophys. Res.*, **90**, 11,667–11,677.
- Bruegge, C.J., V.G. Duval, N.L. Chrien, and D.J. Diner, 1993: Calibration plans for the Multi-angle Imaging Spectroradiometer (MISR). *Metrologia*, **30**(4), 213–221.
- Bruening, R.J., 1987: Spectral irradiance scales based on filtered absolute silicon photodetectors. *Appl. Opt.*, **26**, 1,051–1,057.
- Burlov-Vasiljev, K.A., E.A. Gurtovenko, and Y.B. Matvejev, 1992: The Solar Radiation Between 310–680 nm. *Proceedings of the Workshop on the Solar Electromagnetic Radiation Study for Solar Cycle 22*, R.E. Donnelly, Ed., U.S. DOC NOAA Environmental Research Laboratory, Boulder, Colorado, 49–53.
- Butler, W.L., 1962: Absorption of light by turbid materials. *J. Opt. Soc. Amer.*, **52**, 292–299.

— C —

- Campbell, J.W., and J.E. O'Reilly, 1988: Role of satellites in estimating primary productivity on the northwest Atlantic continental shelf. *Cont. Shelf Res.*, **8**, 179–204.
- , and T. Aarup, 1992: New production in the North Atlantic derived from seasonal patterns of surface chlorophyll. *Deep-Sea Res.*, **39**, 1,669–1,694.
- Cantor, A.J., and A.E. Cole, 1985: *Handbook of Geophysics and the Space Environment*, A.S. Jursa, Ed., Air Force Geophysics Laboratory, Air Force Systems Command, USAF, 15–48.
- Capellari, J.O., C.E. Velez, and A.J. Fuchs, 1976: Mathematical Theory of the Goddard Trajectory Determination System. *GSFC X-582-76-77*, NASA Goddard Space Flight Center, Greenbelt, Maryland, 596 pp.
- Caraux, D., and R.W. Austin, 1983: Delineation of Seasonal Changes of Chlorophyll Frontal Boundaries in Mediterranean Coastal Waters with NIMBUS-7 Coastal Zone Color Scanner Data. *Rem. Sens. Environ.*, **13**, 239–249.
- Carder, K.L., and R.G. Steward, 1985: A remote-sensing reflectance model of red-tide dinoflagellate off West Florida. *Limnol. Oceanogr.*, **30**, 286–298.
- , —, J.H. Paul, and G.A. Vargo, 1986: Relationships between chlorophyll and ocean color constituents as they affect remote-sensing reflectance models. *Limnol. Oceanogr.*, **31**, 403–413.
- , G.R. Harvey, R.G. Steward, and P.B. Ortner, 1989: Marine humic and fulvic acids: their effects on remote sensing of ocean chlorophyll. *Limnol. Oceanogr.*, **34**, 68–81.
- , W.W. Gregg, D.K. Costello, K. Haddad, and J.M. Prospero, 1991a: Determination of Saharan dust radiance and chlorophyll *a* from CZCS imagery. *J. Geophys. Res.*, **96**, 5,369–5,378.

- , S.K. Hawes, K.A. Baker, R.C. Smith, R.G. Stewart, and B.G. Mitchell, 1991b: Reflectance model for quantifying chlorophyll *a* in the presence of productivity degradation products. *J. Geophys. Res.*, **96**, 20,599–20,611.
- , P. Reinersman, R.F. Chen, F. Müller-Karger, C.O. Davis, and M. Hamilton, 1993a: AVIRIS calibration and application in coastal oceanic environments. *Remote Sens. Environ.*, **44**, 205–216.
- , R.G. Steward, R.F. Chen, S. Hawes, Z. Lee, and C.O. Davis, 1993b: AVIRIS calibration and application in coastal oceanic environments: Tracers of soluble and particulate constituents of the Tampa Bay coastal plume. *Photogramm. Eng. Remote Sens.*, **59**(3), 339–344.
- , S.K. Hawes, Z. Lee, and F.R. Chen 1997: *MODIS Ocean Science Team Algorithm Theoretical Basis Document Case 2 chlorophyll a*. ATBD-Mod. 19, Version 4, 15 August 1997 [World Wide Web page.] From URL: <http://ltpwww.gsfc.nasa.gov/MODIS/MODIS.html> NASA Goddard Space Flight Center, Greenbelt, Maryland.
- Cardone, V.J., J.G. Greenwood, and M.A. Cane, 1990: On trends in historical marine wind data. *J. Climate*, **3**, 113–127.
- Cebula, R.P., H. Park, and D.F. Heath, 1988: Characterization of the Nimbus-7 SBUV radiometer for the long term monitoring of stratospheric ozone. *J. Atmos. Ocean. Technol.*, **5**, 215–227.
- Cerling, T.E., 1991: Carbon dioxide in the atmosphere: Evidence from Cenozoic and Mesozoic paleosols. *Am. J. Sci.*, **291**, 377–400.
- Chamberlin, W.S., C.R. Booth, D.A. Kiefer, J.H. Morrow, and R.C. Murphy, 1989: Evidence for a simple relationship between natural fluorescence, photosynthesis, and chlorophyll *a* in the sea. *Deep Sea Res.*, **37**, 951–973.
- Chavez, F.P., K.R. Buck, R.R. Bidigare, D.M. Karl, D. Hebel, M. Latasa, L. Campbell and J. Newton, 1995: On the chlorophyll *a* retention properties of glass-fiber GF/F filters. *Limnol. Oceanogr.*, **40**, 428–433.
- Chelton, D.B., and M.G. Schlax, 1991: Estimation of time averages from irregularly spaced observations: With application to coastal zone color scanner estimates of chlorophyll *a* concentrations. *J. Geophys. Res.*, **96**, 14,669–14,692.
- Chin, R.T., C. Jau, and J.A. Weinman, 1987: The application of time series models to cloud field morphology analysis. *J. Climate Appl. Meteor.*, **26**, 363–373.
- Clark, D.K., 1981: Phytoplankton pigment algorithms for the Nimbus-7 CZCS. *Oceanography from Space*, J.F.R. Gower, Ed., Plenum Press, 227–238.
- , 1997: *MODIS Ocean Science Team Algorithm Theoretical Basis Document, Bio-optical Algorithms—Case 1 Waters*, ATBD-Mod. 18, Version 1.2, 30 January 1997 [World Wide Web page.] From URL: <http://modarch.gsfc.nasa.gov/MODIS/ATBD/atbd.html#OCEANS> NASA Goddard Space Flight Center, Greenbelt, Maryland.
- , E.T. Baker, and A.E. Strong, 1980: Upwelled spectral radiance distributions in relation to particulate matter in sea water. *Bound.-Layer Meteor.*, **18**, 287–298.
- Cleveland, J.S., and A.D. Weidemann, 1993: Quantifying absorption by aquatic particles: A multiple scattering correction for glass-fiber filters. *Limnol. Oceanogr.*, **38**, 1,321–1,327.
- Clifford, P., 1994: In discussion of “Approximate Bayesian inference with the weighted likelihood bootstrap” by M.A. Newton and A.E. Raftery, *J. Roy. Statist. Soc. B*, **56**, 34–35.
- Cookley, J.A., Jr., and F.P. Bretherton, 1982: Cloud cover from high resolution scanner data: Detecting and allowing for partially filled fields of view. *J. Geophys. Res.*, **87**, 4,917–4,932.
- Comiso, J.C., N.G. Maynard, W.O. Smith, Jr., and C.W. Sullivan, 1990: Satellite ocean color studies of Antarctic ice edges in summer and autumn. *J. Geophys. Res.*, **95**, 9,481–9,496.
- , C.R. McClain, C.W. Sullivan, J.P. Ryan, and C.L. Leonard, 1993: Coastal zone color scanner pigment concentrations in the Southern Ocean and relationships to geophysical surface features. *J. Geophys. Res.*, **98**, 2,419–2,451.
- Corredora, P., A. Corróns, A. Pons, and J. Campos, 1990: Absolute spectral Irradiance scale in the 700–2400 nm spectral range. *Appl. Opt.*, **29**, 3,530–3,534.
- Cox, C., and W. Munk, 1954a: Measurement of the roughness of the sea surface from photographs of the sun's glitter. *J. Opt. Soc. Am.*, **44**, 838–850.
- , and —, 1954b: Statistics of the sea surface derived from sun glitter. *J. Mar. Res.*, **13**, 198–277.
- , and —, 1955: *Some Problems in Optical Oceanography*. Scripps Institution of Oceanography, La Jolla, California, 63–77.
- Crane, R.J., and M.R. Anderson, 1984: Satellite discrimination of snow/cloud surfaces. *Int. J. Remote Sens.*, **5**, 213–223.
- Crow, E.L., and K. Shimizu, editors, 1988: *Lognormal Distributions: Theory and Applications*, Marcel Dekker, Inc., New York, 387 pp.
- Culkin, F., and N.D. Smith, 1980: Determination of the concentration of KCl solution having the same electric conductivity at 15°C and infinite frequency as standard seawater of salinity 35 ppt (chlorinity 19.37394 ppt). *IEEE J. Ocean Eng.*, **5**, 22–25.
- Cullen, J.J., 1990: On models of growth and photosynthesis in phytoplankton. *Deep-Sea Res.*, **37**, 667–683.
- , 1991: Hypotheses to explain high-nutrient conditions in the open sea. *Limnol. Oceanogr.*, **36**, 1,578–1,599.
- Curran, R.J., 1972: Ocean color determination through a scattering atmosphere. *Appl. Opt.*, **11**, 1,857–1,866.
- , H.L. Kyle, L.R. Blaine, J. Smith, and T.D. Clem, 1981: Multichannel scanning radiometer for remote sensing cloud physical parameters. *Rev. Sci. Instrum.*, **52**, 1,546–1,555.
- Darzi, M., 1992: Cloud Screening for Polar Orbiting Visible and IR Satellite Sensors. *NASA Tech. Memo. 104566*, Vol. 7, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 7 pp.

- , J. Chen, J. Firestone, and C.R. McClain, 1989: SEA-PAK: A satellite image analysis system for oceanographic research. *Proc. Fifth Intl. Conf. Interactive Information Processing Systems for Meteorol., Oceanogr., and Hydrol.*, Am. Meteorol. Soc., Atlanta, Georgia, 26–32.
- , F.S. Patt, J.K. Firestone, B. Schieber, L. Kumar, and D. Ilg, 1995: *SeaWiFS Operational Archive Product Specifications*. [World Wide Web page.] From URL: <http://seawifs.gsfc.nasa.gov/SEAWIFS/SOFTWARE/SOFTWARE.html> see "SeaWiFS Product Specifications (postscript)" NASA Goddard Space Flight Center, Greenbelt, Maryland.
- Dave, J.V., 1972a: Development of programs for computing characteristics of ultraviolet radiation. *Technical Report—Vector Case, Program IV*, FSC-72-0013, IBM Federal Systems Division, Gaithersburg, Maryland, 138 pp.
- , 1972b: Development of programs for computing characteristics of ultraviolet radiation. *Technical Report—Scalar Case, Program II*, FSC-72-0011, IBM Federal Systems Division, Gaithersburg, Maryland, 38 pp.
- Denman, K.L., and M.R. Abbott, 1988: Time evolution of surface chlorophyll patterns from cross spectrum analysis of satellite color images. *J. Geophys. Res.*, **93**, 6,789–6,798.
- Dera, J., and H.R. Gordon, 1968: Light field fluctuations in the photic zone. *Limnol. Oceanogr.*, **13**, 697–699.
- Detwiler, A., 1990: Analysis of cloud imagery using box counting. *Int. J. Remote Sens.*, **11**, 887–898.
- Deuser, W.G., F.E. Müller-Karger, and C. Hemleben, 1988: Temporal variations of particle fluxes in the deep subtropical and tropical North Atlantic: Eulerian versus Lagrangian effects. *J. Geophys. Res.*, **93**, 6,857–6,862.
- , —, R.H. Evans, O.B. Brown, W.E. Esaias, and G.C. Feldman, 1990: Surface-ocean color and deep-sea carbon flux: how close a connection? *Deep-Sea Res.*, **37**, 1,331–1,343.
- Dickey, T., J. Marra, T. Granata, C. Langdon, M. Hamilton, J. Wiggert, D. Siegel, and A. Bratkovich, 1991: Concurrent high-resolution bio-optical and physical time series observations in the Sargasso Sea during the spring of 1987. *J. Geophys. Res.*, **96**, 8,643–8,663.
- , and D.A. Siegel, (Eds.), 1993: *Bio-Optics in U.S. JGOFS*. Report of the Bio-Optics Workshop, U.S. JGOFS Planning and Coordination Office, Woods Hole, Massachusetts, 180 pp.
- Diefenderfer, A.J., 1972: *Principles of Electronic Instrumentation*. W.B. Saunders, Philadelphia, Pennsylvania, 675 pp.
- Ding, K., and H.R. Gordon, 1994: Analysis of the influence of O<sub>2</sub> "A" band absorption on atmospheric correction of ocean color imagery. *Appl. Opt.*, **34**, 2,068–2,080.
- Duffett-Smith, P., 1979: *Practical Astronomy With Your Calculator*. Cambridge University Press, 129 pp.
- Dugdale, R.C., A. Morel, A. Bricaud, and F.P. Wilkerson, 1989: Modeling new production in upwelling centers: A case study of modelling new production from remotely sensed temperature and color. *J. Geophys. Res.*, **94**, 18,119–18,132.
- Duntley, S.Q., R.W. Austin, W.H. Wilson, C.F. Edgerton, and M.E. Moran, 1974: Ocean color analysis. *Visibility Laboratory of the Scripps Institution of Oceanography Report, SIO Ref. 74-10*, La Jolla, California, 70 pp.
- Duygens, L.N.M., 1956: The flattening of the absorption spectrum of suspensions as compared with that of solutions. *Biochim. Biophys. Acta.*, **19**, 255, 257, 261.
- E —
- Ebert, E.E., 1992: Pattern recognition analysis of polar clouds during summer and winter. *Int. J. Remote Sens.*, **13**, 97–109.
- Eck, T.F., and V.L. Kalb, 1991: Cloud-screening for Africa using a geographically and seasonally variable infrared threshold. *Int. J. Remote Sens.*, **12**, 1,205–1,221.
- Eckstein, B.A., and J.J. Simpson, 1991: Cloud screening Coastal Zone Color Scanner images using channel 5. *Int. J. Remote Sens.*, **12**, 2,359–2,377.
- England, C.F., and G.E. Hunt, 1985: A bispectral method for the automatic determination of parameters for use in imaging satellite cloud retrievals. *Int. J. Remote Sens.*, **6**, 1,545–1,553.
- Eppley, R.W., 1972: Temperature and phytoplankton growth in the sea. *Fish. Bull.*, **70**, 1,063–1,085.
- , 1984: Relations between primary productivity and ocean chlorophyll determined by satellites. *Global Ocean Flux Study: Proceedings of a Workshop*, National Academy Press, Washington, DC, 85–102.
- , and B.J. Peterson, 1979: Particulate organic matter flux and planktonic new production in the deep ocean. *Nature*, **282**, 677–680.
- , E. Stewart, M.R. Abbott, and U. Heyman, 1985: Estimating ocean primary production from satellite chlorophyll. Introduction to regional differences and statistics for the Southern California Bight. *J. Plankton Res.*, **7**, 57–70.
- Esaias, W., G. Feldman, C.R. McClain, and J. Elrod, 1986: Satellite observations of oceanic primary productivity. *Eos, Trans. AGU*, **67**, 835–837.
- Evans, G.T., and J.S. Parslow, 1985: A model of annual plankton cycles. *Biol. Oceanogr.*, **3**, 327–347.
- Evans, R.H., and H.R. Gordon, 1994: CZCS "system calibration:" A retrospective examination. *J. Geophys. Res.*, **99**, 7,293–7,307.
- F —
- Falkowski, P.G., 1981: Light-shade adaptation and assimilation numbers. *J. Plankton Res.*, **3**, 203–217.
- , 1997: Evolution of the nitrogen cycle and its influence on the biological sequestration of CO<sub>2</sub> in the ocean. *Nature*, **387**, 272–275.
- , R. Greene, and R. Geider, 1992: Physiological limitations on phytoplankton productivity in the ocean. *Oceanography*, **5**, 84–91.
- Fasham, M.J.R., 1993. Modelling the marine biota. *The Global Carbon Cycle*, M. Heimann, Ed., Springer-Verlag, 457–504.

- , 1995: Variations in the seasonal cycle of biological production in the subarctic ocean: a model sensitivity analysis. *Deep-Sea Res.*, **42**, 1,111–1,149.
- , H.W. Ducklow, and S.M. McKelvie, 1990: A nitrogen-based model of plankton dynamics in the oceanic mixed layer. *J. Mar. Res.*, **48**, 591–639.
- , J.L. Sarmiento, R.D. Slater, H.W. Ducklow, and R. Williams, 1993: Ecosystem behaviour at Bermuda station “S” and ocean weather station “India”: A general circulation model and observational analysis. *Global Biogeochem. Cycles*, **7**, 379–415.
- , and G.T. Evans, 1995: Fitting a model of marine ecosystem dynamics to the JGOFS data set at 47°N 20°W. *Phil. Trans. R. Soc. Lond. B*, **348** (1324), 203–209.
- Feldman, G., 1986: Variability of the productive habitat in the eastern equatorial Pacific. *Eos, Trans. AGU*, **67**, 106–108.
- , D. Clark, and D. Halpern, 1984: Satellite color observations of the phytoplankton distribution in the eastern equatorial Pacific during the 1982–1983 El Niño. *Science*, **226**, 1,069–1,071.
- , N. Kuring, C. Ng, W. Esaias, C. McClain, J. Elrod, N. Maynard, D. Endres, R. Evans, J. Brown, S. Walsh, M. Carle, and G. Podesta, 1989: Ocean Color: Availability of the global data set. *Eos, Trans. AGU*, **70**, 634.
- Firestone, E.R., and S.B. Hooker, 1992: SeaWiFS Technical Report Series Cumulative Index: Volumes 1–5. *NASA Tech. Memo. 104566, Vol. 6*, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 9 pp.
- , and —, 1993: SeaWiFS Technical Report Series Cumulative Index: Volumes 1–11. *NASA Tech. Memo. 104566, Vol. 12*, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 28 pp.
- , and —, 1995: SeaWiFS Technical Report Series Cumulative Index: Volumes 1–17. *NASA Tech. Memo. 104566, Vol. 18*, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 47 pp.
- , and —, 1995: SeaWiFS Technical Report Series Cumulative Index: Volumes 1–23. *NASA Tech. Memo. 104566, Vol. 24*, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 36 pp.
- , and —, 1996: SeaWiFS Technical Report Series Cumulative Index: Volumes 1–35. *NASA Tech. Memo. 104566, Vol. 36*, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 55 pp.
- Firestone, J.K., G. Fu, M. Darzi, and C.R. McClain, 1990: NASA’s SEAPAK software for oceanographic data analysis: An update. *Proc. Sixth Int. Conf. Interactive Information Processing Systems for Meteor., Oceanogr., and Hydrol.*, Am. Meteor. Soc., Anaheim, California, 260–267.
- , and B.D. Scheiber, 1994: “The Generation of Ancillary Data Climatologies.” In: McClain, C.R., K.R. Arrigo, J. Comiso, R. Fraser, M. Darzi, J.K. Firestone, B. Schieber, E-n. Yeh, and C.W. Sullivan: Case Studies for SeaWiFS Calibration and Validation, Part 1. *NASA Tech. Memo. 104566, Vol. 13*, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 35–42.
- Flierl, G., D. Glover, J. Bishop, and S. Paranjpe, 1993: *The JGOFS Distributed Object Oriented Data System User Guide*. Massachusetts Institute of Technology, Cambridge, Massachusetts, 90 pp.
- Flittner, D.E., and P.N. Slater, 1991: Stability of narrow-band filter radiometers in the solar-reflective range. *Photogramm. Eng. Remote Sens.*, **57**, 165–171.
- Fofonoff, N.P., and R.C. Millard, Jr., 1983: Algorithms for Computation of Fundamental Properties of Seawater. *UNESCO Tech. Papers in Mar. Sci.*, **44**, UNESCO, 53 pp.
- Fraser, R.S., 1993: Optical thickness of atmospheric dust over Tadzhikistan. *Atmos. Environ.*, **27A**, 2,533–2,538.
- , R.A. Ferrare, Y.J. Kaufman, B.L. Markham, and S. Mattoo, 1992: Algorithm for atmospheric corrections of aircraft and satellite imagery. *Int. J. Remote Sens.*, **13**, 541–557.
- Frederick, J.E., R.P. Cebula, and D.F. Heath, 1986: Instrument characterization for detection of long-term changes in stratospheric ozone: An analysis of the SBUV/2 radiometer. *J. Atmos. Ocean. Technol.*, **3**, 472–480.
- Freeman, K.H., and J.M. Hayes, 1992: Fractionation of carbon isotopes by phytoplankton and estimates of ancient CO<sub>2</sub> levels. *Global Biogeochem. Cycles*, **6**, 185–198.
- Frohlich, C., 1979: WMO/PMOD Sunphotometer: Instructions for Manufacture. *World Meteor. Org.*, Geneva, Switzerland, 3 pp., (plus tables and drawings).
- Frost, B.W., 1987: Grazing control of phytoplankton stock in the subarctic Pacific: A model assessing the role of mesozooplankton, particularly the large calanoid copepods, *Neocalanus spp.* *Mar. Ecol. Progr. Ser.*, **39**, 49–68.
- , 1991: The role of grazing in nutrient-rich areas of the open seas. *Limnol. Oceanogr.*, **36**, 1,616–1,630.
- Fukuchi, M., 1980: Phytoplankton chlorophyll stocks in the Antarctic ocean. *J. Oceanogr. Soc. Japan*, **36**, 73–84.

## - G -

- Gallaudet, T.C., and J.J. Simpson, 1991: Automated cloud screening of AVHRR imagery using split-and-merge clustering. *Remote Sens. Environ.*, **38**, 77–121.
- Garand, L., 1986: *Automated Recognition of Oceanic Cloud Patterns and Its Application to Remote Sensing of Meteorological Parameters*. Doctoral dissertation, Dept. of Meteorology, Univ. of Wisconsin—Madison.
- Garver, S.A., D.A. Siegel, and B.G. Mitchell, 1995: Variability in near surface particulate absorption spectra: What can a satellite imager see? *Limnol. Oceanogr.*, **39**, 1,349–1,367.
- , and —, 1997: Inherent optical property inversion of ocean color spectra and its biogeochemical interpretation: 1. Time series from the Sargasso Sea. *J. Geophys. Res.*, **102**, 18,607–18,625.
- General Sciences Corp., 1991: SeaWiFS Science Data and Information System Architecture Report. *GSC-TR-21-91-006*, General Sciences Corp., Laurel, Maryland, 133 pp.
- Ghil, M., and P. Malanotte-Rizzoli, 1991: Data assimilation in meteorology and oceanography. *Adv. Geophys.*, **33**, 141–266.

- Gieskes, W.W.C., and G.W. Kraay, 1986: Analysis of phytoplankton pigments by HPLC before, during, and after mass occurrence of the microflagellate *corymbellus* during the spring bloom in the open north North Sea in 1983. *Mar. Biol.*, **92**, 45–52.
- Gleason, J.F., P.K. Bhartia, J.R. Herman, R. McPeters, P. Newman, R.S. Stolarski, L. Flynn, G. Labow, D. Larko, C. Seftor, C. Wellemeyer, W.D. Komhyr, A.J. Miller, and W. Planet, 1993: Record low global ozone in 1992. *Science*, **260**, 523–526.
- Goericke, R., and D.J. Repeta, 1993: Chlorophylls *a* and *b* and divinyl chlorophylls *a* and *b* in the open subtropical North Atlantic Ocean. *Mar. Ecol. Prog. Ser.*, **10**, 307–313.
- Gordon, H.R., 1976: Radiative transfer: a technique for simulating the ocean in satellite remote sensing calculations. *Appl. Opt.*, **15**, 1,974–1,979.
- , 1978: Removal of atmospheric effects from satellite imagery of the oceans. *Appl. Opt.*, **17**, 1,631–1,636.
- , 1981a: Reduction of error introduced in the processing of coastal zone color scanner-type imagery resulting from sensor calibration and solar irradiance uncertainty. *Appl. Opt.*, **20**, 207–210.
- , 1981b: A preliminary assessment of the Nimbus-7 CZCS atmospheric correction algorithm in a horizontally inhomogeneous atmosphere. *Oceanography from Space*, J.F.R. Gower, Ed., Plenum Press, 257–266.
- , 1985: Ship perturbations of irradiance measurements at sea, 1: Monte Carlo simulations. *Appl. Opt.*, **24**, 4,172–4,182.
- , 1987a: Calibration requirements and methodology for remote sensors viewing the ocean in the visible. *Remote Sens. Environ.*, **22**, 103–126.
- , 1987b: Visible calibration of ocean-viewing sensors. *Remote Sens. of Environ.*, **22**, 103–126.
- , 1988: Ocean color remote sensing systems: radiometric requirements. *Recent Advances in Sensors, Radiometry, and Data Processing for Remote Sensing*, P.N. Slater, Ed., SPIE, **924**, 151–167.
- , 1989a: Dependence of the diffuse reflectance of natural waters on the sun angle. *Limnol. Oceanogr.*, **34**, 1,484–1,489.
- , 1989b: Can the Lambert-Beer law be applied to the diffuse attenuation coefficient of ocean water? *Limnol. Oceanogr.*, **34**, 1,389–1,409.
- , 1990: Radiometric considerations for ocean color remote sensors. *Appl. Opt.*, **29**, 3,228–3,236.
- , 1991: Absorption and scattering estimates from irradiance measurements: Monte Carlo simulations. *Limnol. Oceanogr.*, **36**, 769–777.
- , 1993: Radiative transfer in the atmosphere for correction of ocean color remote sensors. *Ocean Colour: Theory and Applications in a Decade of CZCS Experience*. V. Barale and P.M. Schlittenhardt, Eds., Kluwer Academic Publishers, 33–77.
- , J.M. Smith, and O.B. Brown, 1971: Spectra of underwater light-field fluctuations in the photic zone. *Bull. Mar. Sci.*, **21**, 466–470.
- , and D.K. Clark, 1980: Remote sensing optical properties of a stratified ocean: an improved interpretation. *Appl. Opt.*, **19**, 3,428–3,430.
- , —, J.L. Mueller, and W.A. Hovis, 1980: Phytoplankton pigments from the NIMBUS-7 Coastal Zone Color Scanner: Comparisons with surface measurements. *Science*, **210**, 63–66.
- , —, 1981: Clear water radiances for atmospheric correction of coastal zone color scanner imagery. *Appl. Opt.*, **20**, 4,175–4,180.
- , —, J.W. Brown, O.B. Brown, and R.H. Evans, 1982: Satellite measurements of phytoplankton pigment concentration in the surface waters of a warm core Gulf Stream ring. *J. Mar. Res.*, **40**, 491–502.
- , —, —, —, —, and W.W. Broenkow, 1983a: Phytoplankton pigment concentrations in the Middle Atlantic Bight: Comparison of ship determinations and CZCS estimates. *Appl. Opt.*, **22**, 20–36.
- , J.W. Brown, O.B. Brown, R.H. Evans, and D.K. Clark, 1983b: Nimbus 7 CZCS: reduction of its radiometric sensitivity with time. *Appl. Opt.*, **24**, 3,929–3,931.
- , and A.Y. Morel, 1983c: Remote assessment of ocean color for interpretation of satellite visible imagery: review. *Lecture Notes on Coastal and Estuarine Studies*, Vol. 4, Springer-Verlag, 114 pp.
- , and D.J. Castaño, 1987: Coastal Zone Color Scanner atmospheric correction algorithm: multiple scattering effects. *Appl. Opt.*, **26**, 2,111–2,122.
- , O.B. Brown, R.H. Evans, J.W. Brown, R.C. Smith, K.S. Baker, and D.K. Clark, 1988a: A semianalytic radiance model of ocean color. *J. Geophys. Res.*, **93**, 10,909–10,924.
- , J.W. Brown, and R.H. Evans, 1988b: Exact Rayleigh scattering calculations for use with the Nimbus-7 Coastal Zone Color Scanner. *Appl. Opt.*, **27**, 5, 862–871.
- , and D.J. Castaño, 1989: Aerosol analysis with Coastal Zone Color Scanner: A simple method for including multiple scattering effects. *Appl. Opt.*, **28**, 1,320–1,326.
- , and K. Ding, 1992: Self shading of in-water optical instruments. *Limnol. Oceanogr.*, **37**, 491–500.
- , and M. Wang, 1994: Retrieval of water-leaving radiances and aerosol optical thickness over the oceans with SeaWiFS: a preliminary algorithm, *Appl. Opt.*, **33**, 443–452.
- Gower, J.F.R., 1985: Reduction of the effect of clouds on satellite thermal imagery. *Int. J. Remote Sens.*, **6**, 1,419–1,434.
- Gregg, W.W., 1992: Analysis of Orbit Selection for SeaWiFS: Ascending vs. Descending Node. *NASA Tech. Memo. 104566*, Vol. 2, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 16 pp.
- , and K.L. Carder, 1990: A simple spectral solar irradiance model for cloudless maritime atmospheres. *Limnol. Oceanogr.*, **35**, 1,657–1,675.
- , F.C. Chen, A.L. Mezaache, J.D. Chen, and J.A. Whiting, 1993: The Simulated SeaWiFS Data Set, Version 1. *NASA Tech. Memo. 104566*, Vol. 9, S.B. Hooker, E.R. Firestone, and A.W. Indest, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 17 pp.

- , and F.S. Patt, 1994: Assessment of tilt capability for spaceborne global ocean color sensors. *IEEE Trans. Geosci. Remote Sens.*, **32**, 866–877.
- Griggs, M., 1968: Absorption coefficients of ozone in the ultraviolet and visible regions. *J. Chem. Phys.*, **49**, 857.
- Groom, S.B., and P.M. Holligan, 1987: Remote sensing of coccolithophorid blooms. *Adv. Space Res.*, **7**, 73–78.
- Guenther, B., 1991: Accuracy and precisions actually achieved for large aperture sources for aircraft and space investigations. *Metrologia*, **28**, 229–232.
- Gutman, G., D. Tarpley, and G. Ohring, 1987: Cloud screening for determination of land surface characteristics in a reduced resolution satellite data set. *Int. J. Remote Sens.*, **8**, 859–870.
- H —
- Habermann, T., 1991: *Freeform—A Flexible System of Format Specifications For Data Access*. National Geophysical Data Center, NOAA, 37 pp.
- Hamilton, M.K., C.O. Davis, W.J. Rhea, S.H. Pilorz, and K.L. Carder, 1993: Estimating chlorophyll content and bathymetry of Lake Tahoe using AVIRIS data. *Remote Sens. Environ.*, **44**, 217–230.
- Haury, L.R., J.J. Simpson, J. Pelaez, C. Koblinsky, and D. Wiesenhahn, 1986: Biological consequences of a recurrent eddy off Point Conception, California. *J. Geophys. Res.*, **91**, 12,937–12,956.
- Hay, B.J., C.R. McClain, and M. Petzold, 1993: An assessment of the NIMBUS-7 CZCS calibration for May 1986 using satellite and *in situ* data from the Arabian Sea. *Remote Sens. Environ.*, **43**, 35–46.
- Hayes, S.P., L.J. Mangum, J. Picaut, A. Sumi, and K. Takeuchi, 1991: TOGA-TAO: A moored array for real-time measurements in the tropical Pacific Ocean. *Bull. Am. Meteor. Soc.*, **72**, 339–347.
- Helliwell, W.S., G.N. Sullivan, B. MacDonald, and K.J. Voss, 1990: Ship shadowing: model and data comparison. *Ocean Optics X*, R.W. Spinrad, Ed., SPIE, **1302**, 55–71.
- Herman, J.R., R.D. Hudson, and G.N. Serafino, 1990: An analysis of the 8 year trend in ozone depletion from alternate models of SBUV instrument degradation. *J. Geophys. Res.*, **95**, 7,403–7,416.
- Hoepffner, N., and S. Sathyendranath, 1993: Determination of the major groups of phytoplankton pigments from the absorption spectra of total particulate matter. *J. Geophys. Res.*, **98**, 22,789–22,803.
- Hoge, F.E., and R.N. Swift, 1990: Phytoplankton accessory pigments: Evidence for the influence of phycoerythrin on the submarine light field. *Remote Sens. Environ.*, **34**, 19–25.
- , and —, 1993: The influence of chlorophyll pigment upon the upwelling spectral radiances from the North Atlantic Ocean. *Deep-Sea Res.*, **40**, 265–278.
- Holland, H.D., 1984: *The Chemical Evolution of the Atmosphere and Oceans*, Princeton University Press, Princeton, New Jersey, 372 pp.
- Hollander, D.J., and J.A. McKenzie, 1991: CO<sub>2</sub> control on carbon-isotope fractionation during aqueous photosynthesis: A paleo-pCO<sub>2</sub> barometer. *Geology*, **19**, 929–932.
- Holligan, P.M., M. Viollier, D.S. Harbour, P. Camus, and M. Champagne-Philippe, 1983: Satellite and ship studies of coccolithophore production along a continental shelf edge. *Nature*, **304**, 339–342.
- , and W.M. Balch, 1991: From the ocean to cells: coccolithophore optics and biogeochemistry. *Particle Analysis in Oceanography*, S. Demers, Ed., Springer-Verlag, Berlin, 301–324.
- , E. Fernandez, J. Aiken, W.M. Balch, P. Boyd, P.H. Burkill, M. Finch, S.B. Groom, G. Malin, K. Muller, D.A. Purdie, C. Robinson, C.C. Trees, S.M. Turner, and P. van der Wal, 1993: A biogeochemical study of the coccolithophore, *Emiliania huxleyi*, in the North Atlantic. *Global Biogeochem. Cycles*, **7**, 879–900.
- Holm-Hansen, O., C.J. Lorenzen, R.W. Holmes, and J.D.H. Strickland, 1965: Fluorometric determination of chlorophyll. *J. du Cons. Int'l. pour l'Explor. de la Mer*, **30**, 3–15.
- Hooker, S.B., P.L. Coronado, W.E. Esaias, G.C. Feldman, W.W. Gregg, C.R. McClain, B.W. Meeson, L.M. Olsen, R.A. Barnes, and E.F. Del-Colle, 1992a: *Baselines and Background Documentation*, SeaWiFS Science Team Meeting, January, 1993, Volume 1, S.B. Hooker and W.E. Esaias, Eds., SeaWiFS Proj. Office, NASA Goddard Space Flight Center, Greenbelt, Maryland, 244 pp.
- , W.E. Esaias, G.C. Feldman, W.W. Gregg, and C.R. McClain, 1992b: An Overview of SeaWiFS and Ocean Color. *NASA Tech. Memo. 104566*, Vol. 1, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 24 pp., plus color plates.
- , and W.E. Esaias, 1993: An overview of the SeaWiFS project. *Eos, Trans. AGU*, **74**, 241–246.
- , W.L. Barnes W.E. Esaias, G.C. Feldman, W.W. Gregg, R.G. Kirk, C.R. McClain, C.H. Vermillion, D.J. Zukor, R.A. Barnes, 1993a: *SeaWiFS Project Presentations*, SeaWiFS Science Team Meeting, January, 1993, Volume 2. S.B. Hooker and W.E. Esaias, Eds., SeaWiFS Proj. Office, NASA Goddard Space Flight Center, Greenbelt, Maryland, 235 pp.
- , W.E. Esaias, and L.A. Rexrode, 1993b: Proceedings of the First SeaWiFS Science Team Meeting. *NASA Tech. Memo. 104566*, Vol. 8, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 61 pp.
- , C.R. McClain, and A. Holmes, 1993c: Ocean color imaging: CZCS to SeaWiFS. *Mar. Tech. Soc. J.*, **27**, 3–15.
- , —, J.K. Firestone, T.L. Westphal, E-n. Yeh, and Y. Ge, 1994: The SeaWiFS Bio-Optical Archive and Storage System (SeaBASS), Part 1. *NASA Tech. Memo. 104566*, Vol. 20, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 40 pp.
- , and J. Aiken, 1998: Calibration evaluation and radiometric testing of field radiometers with the SeaWiFS Quality Monitor (SQM). *J. Atmos. Oceanic Tech.*, (in press).

SeaWiFS Prelaunch Technical Report Series Final Cumulative Index

- Hoots, F.R., and R.L. Roehrich, 1980: Models for Propagation of NORAD Element Sets. *Project Spacetrack Report No. 9*, 100 pp.
- Hoppel, W.A., J.W. Fitzgerald, G.M. Frick, and R.E. Larson, 1990: Aerosol size distributions and optical properties found in the marine boundary layer over the Atlantic Ocean. *J. Geophys. Res.*, **95**, 3,659–3,686.
- Houghton, J.T., G.J. Jenkins, and J.J. Ephraums, 1990: *Climate Change: The IPCC Scientific Assessment*, Cambridge University Press, New York, 416 pp.
- Hovis, W.A., 1981: The Nimbus-7 Coastal Zone Color Scanner (CZCS) program. *Oceanography from Space*, J.F.R. Gower, Ed., Plenum Press, 213–225.
- , and K.C. Leung, 1977: Remote sensing of ocean color. *Optical Eng.*, **16**, 158–166.
- , D.K. Clark, F. Anderson, R.W. Austin, W.H. Wilson, E.T. Baker, D. Ball, H.R. Gordon, J.L. Mueller, S. El-Sayed, B. Sturm, R.C. Wrigley, and C.S. Yentsch, 1980: NIMBUS-7 Coastal Zone Color Scanner: System description and initial imagery. *Science*, **210**, 60–63.
- , J.S. Knoll, and G.R. Smith, 1985: Aircraft measurements for calibration of an orbiting spacecraft sensor. *Appl. Opt.*, **24**, 407–410.
- Hudson, S.J., G.F. Moore, A.J. Bale, K.R. Dyer, and J. Aiken, 1994: An operational approach to determining suspended sediment distributions in the Humber estuary by airborne multi-spectral imagery. *Proc. First Int. Airborne Remote Sens. Conf.*, **3**, 10–20.
- Hughes, C.G., III, 1982: Silicon photodiode absolute spectral self-calibration using a filtered tungsten source. *Appl. Opt.*, **21**, 2,129–2,132.
- I —
- Imbrie, J., E.A. Boyle, S.C. Clemens, A. Duffy, W.R. Howard, G. Kukla, J. Kutzbach, D.G. Martinson, A. McIntyre, A.C. Mix, B. Molino, J.J. Morely, L.C. Peterson, N.G. Pisias, W.L. Prell, M.E. Raymo, N.J. Shackleton, and R. Toggweiler, 1992: On the structure and origin of major glaciation cycles. I. Linear responses to Milankovitch forcing. *Paleoceanogr.*, **7**, 701–738.
- Inn, E.C.Y., and Y. Tanaka, 1953: Absorption coefficient of ozone in the ultraviolet and visible regions. *J. Opt. Soc. Amer.*, **43**, 870–873.
- Iqbal, M., 1983: *An Introduction to Solar Radiation*. Academic Press, 390 pp.
- Ishizaka, J., 1990a: Coupling of Coastal Zone Color Scanner data to physical-biological model of the southeastern U.S. continental shelf ecosystem, 1. CZCS data description and Lagrangian particle tracing experiments. *J. Geophys. Res.*, **95**, 10,167–10,181.
- , 1990b: Coupling of Coastal Zone Color Scanner data to physical-biological model of the southeastern U.S. continental shelf ecosystem, 2. an Eulerian model. *J. Geophys. Res.*, **95**, 10,183–10,199.
- , 1990c: Coupling of Coastal Zone Color Scanner data to physical-biological model of the southeastern U.S. continental shelf ecosystem, 3. nutrient and phytoplankton fluxes and CZCS data assimilation. *J. Geophys. Res.*, **95**, 10,201–10,212.
- , 1993: Data assimilation for biogeochemical models. In: *Towards a Model of Ocean Biogeochemical Models*, G.T. Evans and M.J.R. Fasham, Eds., Springer-Verlag, 295–316.
- J —
- James, H.R., and E.A. Birge, 1938: A laboratory study of the absorption of light by lake waters. *Trans. Wis. Acad. Sci.*, **31**, 1–154.
- Jerlov, N.G., 1976: *Marine Optics*, Elsevier Scientific Publishing Co., 231 pp.
- JGOFS Photosynthesis Measurements Task Team, 1998: Measurement of the parameters of photosynthesis: Light absorption and quantum yield of photosynthesis derived from *P* vs. *E* determinations. *J. Plankton Res.*, (in press).
- Johnson, B.C., S.S. Bruce, E.A. Early, J.M. Houston, T.R. O'Brian, A. Thompson, S.B. Hooker, and J.L. Mueller, 1996: The Fourth SeaWiFS Intercalibration Round-Robin Experiment (SIRREX-4), May 1995. *NASA Tech. Memo. 104566*, Vol. 37, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 65 pp.
- , P.-S. Shaw, S.B. Hooker, and D. Lynch, 1998: Radiometric and Engineering Performance of the SeaWiFS Quality Monitor (SQM). *J. Atmos. Oceanic Tech.*, (in press).
- Joint EOSAT-NASA SeaWiFS Working Group, 1987: System concept for wide-field-of-view observations of ocean phenomena from space. *Report of the Joint EOSAT/NASA SeaWiFS Working Group*, Earth Observation Satellite Co., Lanham, Maryland, 92 pp.
- Joint Global Ocean Flux Study, 1991: JGOFS Core Measurements Protocols. *JGOFS Report No. 6*, Scientific Committee on Oceanic Research, 40 pp.
- Joint, I.R., and A.J. Pomroy, 1983: Production of picoplankton and small nanoplankton in the Celtic Sea. *Mar. Biol.*, **77**, 19–27.
- Joseph, J.H., 1985: The morphology of fair weather cumulus cloud fields as remotely sensed from satellites and some applications. *Adv. Space Res.*, **5**, 213–216.
- Journal, A.G., 1989: Fundamentals of Geostatistics in Five Lessons, Short Course. *Geology*: Vol. 8, American Geophysical Union, Washington, D.C., 40 pp.
- Jursa, A.S., 1985: *Handbook of Geophysics and the Space Environment*. Air Force Geophysics Laboratory, 18-11-18-24.
- Justice, J.O., B.L. Markham, J.R.G. Townshend, and R.L. Kennard, 1989: Spatial degradation of satellite data. *Int. J. Remote Sens.*, **10**, 1,539–1,561.
- Justus, C.G., and M.V. Paris, 1985: A model for solar spectral irradiance and radiance at the bottom and top of a cloudless atmosphere. *J. Climate Appl. Meteor.*, **24**, 193–205.
- K —
- Kamykowski, D., and S-J. Zentara, 1986: Predicting plant nutrient concentrations from temperature and sigma-t in the upper kilometer of the world ocean. *Deep-Sea Res.*, **33**, 89–105.
- Kasten, F., 1966: A new table and approximate formula for relative optical air mass. *Geophys. Biokimatal.*, **B14**, 206–223.

- Kasting, J.F., 1993: Algae and Earth's ancient atmosphere. *Science*, **259**, 835.
- Kaufman, Y.J., 1987: The effect of subpixel clouds on remote sensing. *Int. J. Remote Sens.*, **8**, 839–857.
- Keeling, R.F., and S.R. Shertz, 1992: Seasonal and interannual variations in atmospheric oxygen and implications for the global carbon cycle. *Nature*, **358**, 723–727.
- , S.C. Piper, and M. Heimann, 1996: Global and hemispheric CO<sub>2</sub> sinks deduced from changes in atmospheric O<sub>2</sub> concentration. *Nature*, **381**, 218–221.
- Kelly, K.A., 1985: Separating clouds from ocean in infrared images. *Remote Sensing Environ.*, **17**, 67–83.
- Kerr, R.A., 1993: Ozone takes a nose dive after the eruption of Mt. Pinatubo. *Science*, **260**, 490–491.
- Key, J.R., and R.G. Barry, 1989: Cloud cover analysis with Arctic AVHRR data. 1. Cloud detection. *J. Geophys. Res.*, **94**, 18,521–18,535.
- , J.A. Maslanik, and R.G. Barry, 1989: Cloud classification from satellite data using a fuzzy sets algorithm: A polar example. *Int. J. Remote Sens.*, **10**, 1,823–1,842.
- Kidwell, K.B., 1991: *NOAA Polar Orbiter User's Guide*. NOAA NESDIS, Washington, D.C., 279 pp.
- Kiefer, D.A., and R.A. Reynolds, 1992: Advances in understanding phytoplankton fluorescence and photosynthesis. *Primary Productivity and Biogeochemical Cycles in the Sea*, P.G. Falkowski and A.D. Woodhead, Eds., Plenum Press, 155–174.
- King, M.D., D.M. Byrne, B.M. Herman, and J.A. Reagan, 1978: Aerosol size distributions obtained by inversion of spectral optical depth measurements. *J. Atmos. Sci.*, **35**, 2,153–2,167.
- , Y.J. Kaufman, W.P. Menzel, and D. Tanre, 1992: Remote sensing of cloud, aerosol, and water vapor properties from the Moderate Resolution Imaging Spectrometer (MODIS). *IEEE Trans. Geosci. Remote Sens.*, **30**, 2–27.
- Kirk, J.T.O., 1983: *Light and Photosynthesis in Aquatic Ecosystems*. Cambridge University Press, Cambridge, 401 pp.
- Kirkwood, D.S., 1989: Simultaneous determination of selected nutrients in seawater. *ICES CM1989/C.29*, 12 pp.
- Kishino, M., N. Okami, and S. Ichimura, 1985: Estimation of the spectral absorption coefficients of phytoplankton in the sea. *Bull. Mar. Sci.*, **37**, 634–642.
- Kneizys, F.X., E.P. Shettle, W.O. Gallery, J.H. Chetwynd, L.W. Abreu, J.E.A. Selby, S.A. Clough, and R.W. Fenn, 1983: *Atmospheric transmittance/radiance: computer code LOWTRAN 6*. AFGL-TR-83-0187, Air Force Geophysics Lab, Hanscom AFB, Massachusetts, 200 pp.
- Koblentz-Mishke, J.J., V.V. Valkovinsky, and J.C. Kabanova, 1970: "Plankton primary production of the world ocean." In: *Scientific Exploration of the South Pacific*. W.S. Wooster, Ed., National Academy Press, Washington, D.C., 183–193.
- Koepke, P., 1985: The reflectance factors of a rough ocean with foam. Comment on "Remote sensing of sea state using the 0.8–1.1 m spectral band" by L. Wald and M. Monget. *Int. J. Remote Sens.*, **6**, 787–799.
- Kohler, R., R. Pello, and J. Bonhoure, 1990: Temperature dependent nonlinearity effects of a QED-200 detector in the visible. *Appl. Opt.*, **29**, 4,212–4,215.
- Kolber, Z., K.D. Wyman, and P.G. Falkowski, 1990: Natural variability in photosynthetic energy conversion efficiency: A field study in the Gulf of Maine. *Limnol. Oceanogr.*, **35**, 72–79.
- , and P. Falkowski, 1993: Use of active fluorescence to estimate phytoplankton photosynthesis *in situ*. *Limnol. Oceanogr.*, **38**, 1,646–1,665.
- Kuring, N., M.R. Lewis, T. Platt, and J.E. O'Reilly, 1990: Satellite-derived estimates of primary production on the northwest Atlantic continental shelf. *Cont. Shelf Res.*, **10**, 461–484.
- L —
- Latasa, M., R.R. Bidigare, M.E. Ondrusek, M.C. Kennicutt, 1996: HPLC Analysis of Algal Pigments—A Comparison Exercise Among Laboratories and Recommendations for Improved Analytical Performance. *Mar. Chem.*, **51**, 315–324.
- Lawson, L.M., Y.H. Spitz, E.E. Hofmann, and R.B. Long, 1995: A data assimilation technique applied to a predator-prey model. *Bull. Math. Bio.*, **57**, 593–617.
- Lean, R.S., and B.K. Burnison, 1979: An evaluation of the errors in the <sup>14</sup>C method of primary production measurement. *Limnol. Oceanogr.*, **24**, 917–928.
- Lee, Z., K.L. Carder, S.K. Hawes, R.G. Steward, T.G. Peacock, and C.O. Davis, 1992: An interpretation of high spectral resolution remote sensing reflectance. *Optics of the Air-Sea Interface: Theory and Measurement*, L. Estep, Ed., SPIE, **1749**, 49–64.
- Letelier, R.M., R.R. Bidigare, D.V. Hebel, M.E. Ondrusek, C.D. Winn, and D.M. Karl, 1993: Temporal variability of phytoplankton community structure at the U.S.-JGOFS time-series Station ALOHA (22° 45' N, 158° W) based on HPLC pigment analysis. *Limnol. Oceanogr.*, **38**, 1,420–1,437.
- Lewis, M.R., N. Kuring, and C.S. Yentsch, 1988: Global patterns of ocean transparency: Implications for the new production of the open ocean. *J. Geophys. Res.*, **93**, 6,847–6,856.
- Longhurst, A., S. Sathyendranath, T. Platt, and C. Caverhill, 1995: An estimate of global primary production in the ocean from satellite radiometer data. *J. Plankton Res.*, **17**, 1,245–1,271.
- Lyddane, R.H., 1963: Small eccentricities or inclinations in the Brouwer theory of the artificial satellite. *Astron. J.*, **68**, 555–558.
- Lynnes, C., B. Vollmer, H. Griffioen, and P. King, 1992: *Metadata Submission Guide, version 0.9*. NASA Goddard Space Flight Center DAAC, Greenbelt, Maryland, 11 pp.
- M —
- Maffione, R.A., D.R. Dana, and R.C. Honey, 1991: Instrument for underwater measurement of optical backscatter. In: *Underwater Imaging, Photography, and Visibility*, R.W. Spinrad, Ed., SPIE, **1,537**, 173–184.

SeaWiFS Prelaunch Technical Report Series Final Cumulative Index

- Mantoura, R.F.C., and C.A. Llewellyn, 1983: The rapid determination of algal chlorophyll and carotenoid pigments and their breakdown products in natural waters by reverse-phase high-performance liquid chromatography. *Anal. Chim. Acta*, **151**, 297–314.
- Marshall, B.R., and R.C. Smith, 1990: Raman scattering and in-water optical properties. *Appl. Opt.*, **29**, 71–84.
- Martin, D.L., 1992: *Minimizing Systematic Errors in Phytoplankton Pigment Concentration Derived from Satellite Ocean Color Measurements*. Ph.D. dissertation, University of Washington, Seattle, Washington, 121 pp.
- Martin, J.H., 1992: "Iron as a limiting factor in oceanic productivity." In: *Primary Productivity and Biogeochemical Cycles in the Sea*. P.G. Falkowski and A.D. Woodhead, Eds., Plenum Press, New York, 123–137.
- , and S.E. Fitzwater, 1988: Iron deficiency limits phytoplankton growth in the northeast Pacific subarctic. *Nature*, **331**, 341–343.
- McClain, C.R., and L.P. Atkinson, 1985: A note on the Charleson Gyre. *J. Geophys. Res.*, **90**, 11,857–11,861.
- , S.-Y. Chao, L. Atkinson, J. Blanton, and F. de Castillejo, 1986: Wind-driven upwelling in the vicinity of Cape Finisterre, Spain. *J. Geophys. Res.*, **91**, 8,470–8,486.
- , J.A. Yoder, L.P. Atkinson, J.O. Blanton, T.N. Lee, J.J. Singer, and F. Müller-Karger, 1988: Variability of Surface Pigment Concentrations in the South Atlantic Bight. *J. Geophys. Res.*, **93**, 10,675–10,697.
- , J. Ishizaka, and E. Hofmann, 1990a: Estimation of phytoplankton pigment changes on the Southeastern U.S. continental shelf from a sequence of CZCS images and a coupled physical-biological model. *J. Geophys. Res.*, **95**, 20,213–20,235.
- , W.E. Esaias, G.C. Feldman, J. Elrod, D. Endres, J. Firestone, M. Darzi, R. Evans, and J. Brown, 1990b: Physical and biological processes in the North Atlantic during the First Global GARP Experiment. *J. Geophys. Res.*, **95**, 18,027–18,048.
- , M. Darzi, J. Firestone, E.-n. Yeh, G. Fu, and D. Endres, 1991a: SEAPAK Users Guide, Version 2.0, Vol. I—System Description. *NASA Tech. Mem. 100728*, NASA Goddard Space Flight Center, Greenbelt, Maryland, 158 pp.
- , —, —, —, —, and —, 1991b: SEAPAK Users Guide, Version 2.0, Vol. II—Descriptions of Programs. *NASA Tech. Mem. 100728*, NASA Goddard Space Flight Center, Greenbelt, Maryland, 586 pp.
- , C.J. Koblinsky, J. Firestone, M. Darzi, E.-n. Yeh, and B. Beckley, 1991c: An examination of some Southern Ocean data sets, *EOS Trans. AGU*, **72**, 345–351.
- , W.E. Esaias, W. Barnes, B. Guenther, D. Endres, S.B. Hooker, G. Mitchell, and R. Barnes, 1992a: Calibration and Validation Plan for SeaWiFS. *NASA Tech. Memo. 104566*, Vol. 3, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 41 pp.
- , G. Fu, M. Darzi, and J.K. Firestone, 1992b: PC-SEAPAK User's Guide, Version 4.0. *NASA Technical Memorandum 104557*, NASA Goddard Space Flight Center, Greenbelt, Maryland, 408 pp.
- , E.-n. Yeh, and G. Fu, 1992c: An Analysis of GAC Sampling Algorithms: A Case Study. *NASA Tech. Memo. 104566*, Vol. 4, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 20 pp., plus color plates.
- , G. Feldman, and W. Esaias, 1993: Oceanic biological productivity. *Atlas of Satellite Observations Related to Global Change*, R.J. Gurney, J.L. Foster, and C.L. Parkinson, Eds., Cambridge University Press, 251–263.
- , and E.-n. Yeh, 1994a: "Pixel-by-pixel pressure and ozone correction study," In: McClain, C.R., J.C. Comiso, R.S. Fraser, J.K. Firestone, B.D. Schieber, E.-n. Yeh, K.R. Arrigo, C.W. Sullivan: Case Studies for SeaWiFS Calibration and Validation, Part 1. *NASA Tech. Memo. 104566*, Vol. 13, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 21–26.
- , and —, 1994b: "CZCS Bio-Optical Algorithm Comparison." In: McClain, C.R., J.C. Comiso, R.S. Fraser, J.K. Firestone, B.D. Schieber, E.-n. Yeh, K.R. Arrigo, and C.W. Sullivan: Case Studies for SeaWiFS Calibration and Validation, Part 1. *NASA Tech. Memo. 104566*, Vol. 13, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 3–8.
- , and —, 1994c: "Sun glint flag sensitivity study." In: C.R. McClain, J.C. Comiso, R.S. Fraser, J.K. Firestone, B.D. Schieber, E.-n. Yeh, K.R. Arrigo, and C.W. Sullivan: Case Studies for SeaWiFS Calibration and Validation, Part 1. *NASA Tech. Memo. 104566*, Vol. 13, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 46–47.
- , R.S. Fraser, and E.-n. Yeh, 1994: "SeaWiFS Pressure and Oxygen Absorption Study," In: McClain, C.R., J.C. Comiso, R.S. Fraser, J.K. Firestone, B.D. Schieber, E.-n. Yeh, K.R. Arrigo, C.W. Sullivan: Case Studies for SeaWiFS Calibration and Validation, Part 1. *NASA Tech. Memo. 104566*, Vol. 13, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 15–20.
- , R. Evans, J. Brown, and M. Darzi, 1995: "SeaWiFS Quality Control Masks, and Flags: Initial Algorithms and Implementation Strategy," In: McClain, C.R., W.E. Esaias, M. Darzi, F.S. Patt, R.H. Evans, J.W. Brown, K.R. Arrigo, C.W. Brown, R.A. Barnes, and L. Kumar: SeaWiFS Algorithms, Part 1. *NASA Tech. Memo. 104566*, Vol. 28, S.B. Hooker, E.R. Firestone, and J.G. Acker, Eds., NASA Goddard Space Flight Center, 3–7.
- McClain, E.P., 1989: Global sea surface temperatures and cloud clearing for aerosol optical depth estimates. *Int. J. Remote Sens.*, **10**, 763–769.
- , W.G. Pichel, and C.C. Walton, 1985: Comparative performance of AVHRR-based multichannel sea surface temperatures. *J. Geophys. Res.*, **90**, 11,587–11,601.
- McLean, J.T., and B.W. Guenther, 1989: Radiance calibration of spherical integrators. *Optical Radiation Measurements II*, SPIE, **1109**, 114–121.
- Mecherikunnel, A.T., and H.L. Kyle, 1991: Eleven-year cycle of solar constant variation from spacecraft measurements: 1978 to 1990. *Science*, (withdrawn).

- Medeiros, W.H., and C.D. Wirick, 1992: SEEP II: Shelf Edge Exchange Processes II. Chlorophyll *a* Fluorescence, Temperature, and Beam Attenuation Measurements from Moored Fluorometers. *BNL 47211 Informal Report*, Brookhaven National Laboratory, Upton, New York, 205 pp.
- Megard, R.O. 1972: Phytoplankton, photosynthesis, and phosphorus in Lake Minnetonka, Minnesota. *Limnol. Oceanogr.*, **17**, 68–87.
- Meindl, E.A., and G.D. Hamilton, 1992: Programs of the National Data Buoy Center, *Bull. Am. Meteor. Soc.*, **73**, 985–993.
- Metropolis, N., A.W. Rosenbluth, M.N. Rosenbluth, A.H. Teller, and E. Teller, 1953: Equations of state calculations by fast computing machines. *J. Chem. Phys.*, **21**, 1,087–1,091.
- Michaelsen, J., X. Zhang, and R.C. Smith, 1988: Variability of pigment biomass in the California Current system as determined by satellite imagery. 2. temporal variability. *J. Geophys. Res.*, **93**, 10,883–10,896.
- Miller, C.B., B.W. Frost, B. Booth, P.A. Wheeler, M.R. Landry, and N. Welschmeyer, 1991: Ecological processes in the subarctic Pacific: Iron limitation cannot be the whole story. *Oceanography*, **4**, 71–78.
- Mitchell, B.G., 1990: Algorithms for determining the absorption coefficient for aquatic particulates using the quantitative filter technique. *Ocean Optics X*, R.W. Spinrad, Ed., SPIE, **1302**, 137–148.
- , 1992: Predictive bio-optical relationships for polar oceans and marginal ice zones. *J. Mar. Sys.*, **3**, 91–105.
- , and D.A. Kiefer, 1984: Determination of absorption and fluorescence excitation spectra for phytoplankton. *Marine Phytoplankton and Productivity*, O. Holm-Hansen, L. Bolis, and R. Gilles, Eds., Springer-Verlag, 157–169.
- , and —, 1988: Chlorophyll-*a* specific absorption and fluorescence excitation spectra for light-limited phytoplankton. *Deep-Sea Res.*, **35**, 639–663.
- , and O. Holm-Hansen, 1991: Bio-optical properties of Antarctic Peninsula waters: differentiation from temperate ocean models. *Deep-Sea Res.*, **39**, 1,009–1,028.
- Mitchelson, E.G., N.J. Jacob, J.H. Simpson, 1986: Ocean colour algorithms from the case 2 waters of the Irish Sea in comparison to algorithms from case 1 waters. *Cont. Shelf Res.*, **5**, 403–415.
- Mora, C.I., S.G. Driese, and P.G. Seager, 1991: Carbon dioxide in the Paleozoic atmosphere: Evidence from carbon-isotope compositions of pedogenic carbonate. *Geology*, **19**, 1,017–1,020.
- Morel, A., 1974: Optical properties of pure water and sea water. *Optical Aspects of Oceanography*, N.G. Jerlov and S. Nielsen, Eds., Academic Press, 1–24.
- , 1978: Available, usable, and stored radiant energy in relation to marine photosynthesis. *Deep-Sea Res.*, **25**, 673–688.
- , 1980: In-water and remote measurements of ocean color. *Bound.-Layer Meteor.*, **18**, 178–201.
- , 1988: Optical modeling of the upper ocean in relation to its biogenous matter content (Case I waters). *J. Geophys. Res.*, **93**, 10,749–10,768.
- , 1991: Light and marine photosynthesis: a spectral model with geochemical and climatological implications. *Prog. Oceanogr.*, **26**, 263–306.
- , 1996: Optical properties of oceanic Case 1 waters, revisited. *SPIE Vol. 2963, Ocean Optics XIII*, 108–114.
- , and L. Prieur, 1977: Analysis of variations in ocean color. *Limnol. Oceanogr.*, **22**, 709–722.
- , and R.C. Smith, 1982: Terminology and units in optical oceanography. *Mar. Geod.*, **5**, 335–349.
- , and J.-F. Berthon, 1989: Surface pigments, algal biomass profiles, and potential production of the euphotic layer: Relationships reinvestigated in view of remote-sensing applications. *Limnol. Oceanogr.*, **34**, 1,545–1,562.
- , and Y.-H. Ahn, 1990: Optical efficiency factors of free-living marine bacteria: Influence of bacterioplankton upon the optical properties and particulate organic carbon in oceanic waters. *J. Mar. Res.*, **48**, 145–175.
- , and B. Gentili, 1991: Diffuse reflectance of oceanic waters. I. Its dependence on sun angle as influenced by the molecular scattering contribution. *Appl. Opt.*, **30**, 4,427–4,438.
- , and —, 1993: Diffuse reflectance of oceanic waters. II. Bidirectional aspects. *Appl. Opt.*, **32**, 6,864–6,879.
- Mueller, J.L., 1976: Ocean color spectra measured off the Oregon coast: characteristic vectors. *Appl. Opt.*, **15**, 394–402.
- , 1985: Nimbus-7 CZCS: confirmation of its radiometric sensitivity decay rate through 1982. *Appl. Opt.*, **24**, 1,043–1,047.
- , 1988: Nimbus-7 CZCS: electronic overshoot due to cloud reflectance. *Appl. Opt.*, **27**, 438–440.
- , 1991: Integral Method for Irradiance Profile Analysis. *CHORS Tech. Memo. 007-91*, San Diego State Univ., San Diego, California, 10 pp.
- , 1993: The First SeaWiFS Intercalibration Round-Robin Experiment, SIRREX-1, July 1992. *NASA Tech. Memo. 104566*, Vol. 14, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 60 pp.
- , 1994: Preliminary Comparison of Irradiance Immersion Coefficients for Several Marine Environmental Radiometers (MERs). *CHORS Tech. Memo. 004-94*, Center for Hydro-Optics and Remote Sensing, San Diego State University, San Diego, California, 4 pp.
- , and R.E. Lang, 1989: Bio-optical provinces of the northeast Pacific Ocean: a provisional analysis. *Limnol. Oceanogr.*, **34**, 1,572–1,586.
- , and R.W. Austin, 1992: Ocean Optics Protocols. *NASA Tech. Memo. 104566*, Vol. 5, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 45 pp.

SeaWiFS Prelaunch Technical Report Series Final Cumulative Index

- , B.C. Johnson, C.L. Cromer, J.W. Cooper, J.T. McLean, S.B. Hooker, and T.L. Westphal, 1994: The Second SeaWiFS Intercalibration Round-Robin Experiment, SIR-REX-2, June 1993. *NASA Tech. Memo. 104566, Vol. 16*, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 121 pp.
- , and R.W. Austin, 1995: Ocean Optics Protocols for SeaWiFS Validation, Revision 1. *NASA Tech. Memo. 104566, Vol. 25*, S.B. Hooker, E.R. Firestone, and J.G. Acker, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 66 pp.
- Müller-Karger, F., C.R. McClain, and P. Richardson, 1988: The dispersal of the Amazon water. *Nature*, **333**, 56–59.
- , —, T.R. Fisher, W.E. Esaias, and R. Varela, 1989: Pigment distribution in the Caribbean Sea: Observations from space. *Prog. Oceanogr.*, **23**, 23–64.
- , —, R.N. Sambrotto, and G.C. Ray, 1990: A comparison of ship and CZCS-mapped distributions of phytoplankton in the Southeastern Bering Sea. *J. Geophys. Res.*, **95**, 11,483–11,499.
- , J.J. Walsh, R.H. Evans, and M.B. Meyers, 1991: On the seasonal phytoplankton concentration and sea surface temperature cycles of the Gulf of Mexico as determined by satellites. *J. Geophys. Res.*, **96**, 12,645–12,665.
- N —
- Nakajima, T., M. Tanaka, and T. Yamauchi, 1983: Retrieval of the optical properties of aerosols from aureole and extinction data. *Appl. Opt.*, **22**, 2,951–2,959.
- National Academy of Sciences, 1984: *Global Ocean Flux Study, Proceedings of a Workshop*, National Acad. Press, 360 pp.
- National Aeronautics and Space Administration, 1982: The marine resources experiment program (MAREX). *Report of the Ocean Color Science Working Group*, NASA Goddard Space Flight Center, Greenbelt, Maryland, 107 pp.
- National Oceanic and Atmospheric Administration (NOAA), 1990: *NDBC Data Availability Summary*, 1801-24-02 Rev. E, U.S. Dept. of Commerce, National Data Buoy Center, Stennis Space Center, Mississippi, 88 pp.
- National Research Council, 1990: *TOGA, A Review of Progress and Future Opportunities*. National Academy Press, Washington, D.C., 66 pp.
- National Space Science Data Center, 1991: NSSDC CDF User's Guide for UNIX Systems, version 2.1. *Publication NSSDC-WDC-A-R&S 91-30*, 245 pp.
- , 1993: NODIS (NSSDC's On-line Data and Information Service) [database on-line] Master Directory [cited July 1993] Data Set Information Search; identifier: Multiple Key Word Search—TOMS and COADS.
- Neckel, H., and D. Labs, 1984: The solar radiation between 3300 and 12500 Å. *Sol. Phys.*, **90**, 205–258.
- O —
- Olesen, F.-S., and H. Grassel, 1985: Cloud detection and classification over the oceans at night with NOAA-7. *Int. J. Remote Sens.*, **6**, 1,435–1,444.
- Olsen, L.M., and C.R. McClain, 1992: Cooperative efforts in support of ocean research through NASA's Climate Data System. *Proc. Eighth Int. Conf. on Interactive Inform. and Processing Systems for Meteor., Oceanogr., and Hydrol.*, Am. Meteor. Soc., Boston, Massachusetts, 206–211.
- O'Reilly, J.E., S. Maritorena, B.G. Mitchell, D.A. Siegel, K.L. Carder, S.A. Garver, and C.R. McClain, 1998: Ocean color chlorophyll algorithms for SeaWiFS. *J. Geophys. Res.*, (submitted).
- P —
- Pagano, T.S., and R.M. Durham, 1993: Moderate resolution imaging spectroradiometer (MODIS). *Proc. SPIE*, **1,939**, 2–17.
- Palmer, J.M., 1988: Use of self-calibrated detectors in radiometric instruments. *Recent Advances in Sensors, Radiometry, and Data Processing for Remote Sensing*, P.N. Slater, Ed., SPIE, **924**, 224–231.
- Palmer, K.F., and D. Williams, 1974: Optical properties of water in near infrared. *J. Opt. Soc. Amer.*, **64**, 1,107–1,110.
- Paltridge, G.W., and C.M.R. Platt, 1976: Radiative processes in meteorology and climatology. *Developments in Atmospheric Science*, Vol. 5. Elsevier Scientific Publishing Co., 318 pp.
- Parikh, J.A., 1977: A comparative study of cloud classification techniques. *Remote Sens. Environ.*, **6**, 67–81.
- Parsons, T.R., and C.M. Lalli, 1988: Comparative oceanic ecology of the planktonic communities of the subarctic Atlantic and Pacific Oceans. *Oceanogr. Mar. Biol. Ann. Rev.*, **26**, 317–359.
- Patt, F.S., C.W. Hoisington, W.W. Gregg, and P.L. Coronado, 1993: Analysis of Selected Orbit Propagation Models for the SeaWiFS Mission. *NASA Tech. Memo. 104566, Vol. 11*, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 16 pp.
- , and W.W. Gregg, 1994: Exact closed-form geolocation algorithm for Earth survey sensors. *Inter. J. Remote Sens.*, **15**, 3,719–3,734.
- Pegau, W.S., and J.R.V. Zaneveld, 1993: Temperature dependent absorption of water in the red and near infrared portions of the spectrum. *Limnol. Oceanogr.*, **38**, 188–192.
- , J.S. Cleveland, W. Doss, C.D. Kennedy, R.A. Maffione, J.L. Mueller, R. Stone, C.C. Trees, A.D. Weidemann, W.H. Wells, and J.R.V. Zaneveld, 1995: A comparison of methods for the measurement of the absorption coefficient in natural waters. *J. Geophys. Res.*, **100**, 13,201–13,220.
- Petzold, T.J., 1972: Volume Scattering Functions for Selected Ocean Waters. *SIO Ref. No. 72-78*, Scripps Institution of Oceanography, La Jolla, California, 79 pp.
- , 1988: A Method for Obtaining Analytical Curve Fits to Underwater Radiometric Measurements. *Tech. Memo. Oc Op/TJP-88-06t*, Scripps Institution of Oceanography, La Jolla, California, 20 pp.

- , and R.W. Austin, 1988: Characterization of MER-1032. *Tech. Memo. EV-001-88t*, Vis. Lab., Scripps Institution of Oceanography, La Jolla, California, 56 pp.
- Phulpin, T., M. Derrien, and A. Brard, 1983: A two-dimensional histogram procedure to analyze cloud cover from NOAA satellite high-resolution imagery. *J. Climate Appl. Meteor.*, **22**, 1,332–1,345.
- Pinder, G.F., and W.G. Gray, 1977: *Finite Element Simulation in Surface and Subsurface Hydrology*, Academic Press, 295 pp.
- Platt, T., 1986: Primary production of the ocean water column as a function of surface light intensity: Algorithms for remote sensing. *Deep-Sea Res.*, **33**, 149–163.
- , and S. Sathyendranath, 1988: Oceanic primary production: estimation by remote sensing at local and regional scales. *Science*, **241**, 1,613–1,620.
- , —, C.M. Caverhill, and M.R. Lewis, 1988: Ocean primary production and available light: further algorithms for remote sensing. *Deep-Sea Res.*, **35**, 855–879.
- , C. Caverhill, and S. Sathyendranath, 1991: Basin-scale estimates of oceanic primary production by remote sensing: The North Atlantic. *J. Geophys. Res.*, **96**, 15,147–15,159.
- , and —, 1993: Comment on “The remote sensing of ocean primary productivity: Use of a new data compilation to test satellite algorithms,” by, William Balch et al., *J. Geophys. Res.*, **98**, 16,583–16,584.
- Poole, H.H., 1936: The photo-electric measurement of submarine illumination in offshore waters. *Rapp. Proc-Verb. Conseil Expl. Mar.*, **101**, 9.
- Prasad, K.S., J.T. Hollibaugh, D.C. Schneider, and R.L. Haedrich, 1992: A model for determining primary production on the Grand Banks. *Cont. Shelf. Res.*, 563–576.
- Press, W.H., S.A. Teukolsky, W.T. Vettering, and B.P. Flannery, 1992: *Numerical Recipes in C: The Art of Scientific Computing*. Cambridge University Press, 994 pp.
- Prieur, L., and S. Sathyendranath, 1981: An optical classification of coastal and oceanic waters based on the specific spectral absorption curves of phytoplankton pigments, dissolved organic matter, and other particulate materials. *Limnol. Oceanogr.*, **26**, 671–689.
- Q, R —
- Raschke, E., P. Bauer, and H.J. Lutz, 1992: Remote sensing of clouds and surface radiation budget over polar regions. *Int. J. Remote Sens.*, **13**, 13–22.
- Research Systems, Inc., 1992a: *Interactive Data Language (IDL) User's Guide*, Ver. 3.0. Boulder, Colorado, 356 pp.
- , 1992b: *Interactive Data Language (IDL) Reference Guide, Version 3.0*. Boulder, Colorado, 424 pp.
- Reynolds, D.W., and T.H. Vonder Haar, 1977: A bispectral method for cloud parameter determination. *Mon. Wea. Rev.*, **105**, 446–457.
- Reynolds, R.W., 1988: A real-time global sea surface temperature analysis. *J. Climate*, **1**, 75–86.
- Robbins, L.L., and P.L. Blackwelder, 1992: Biochemical and ultrastructural evidence for the origin of whiting: A biologically induced calcium carbonate precipitation mechanism. *Geology*, **20**, 464–468.
- Roemmich, D., and C. Wunsch, 1985: Two transatlantic sections: Meridional circulation and heat flux in the subtropical North Atlantic Ocean. *Deep-Sea Res.*, 619–664.
- Rossow, W.B., L.C. Garder, P.-J. Lu, and A. Walker, 1988: International Satellite Cloud Climatology Project (ISCCP) Documentation of Cloud Data. *WMO/TD-No. 266*, World Meteor. Org., Geneva, Switzerland.
- , L.C. Garder, and A.A. Lacis, 1989: Global, seasonal cloud variations from satellite radiance measurements. Part I: Sensitivity of analysis. *J. Climate*, **2**, 419–458.
- , and R.A. Schiffer, 1991: ISCCP cloud data products. *Bull. Am. Meteor. Soc.*, **72**, 2–20.
- RSMAS, 1990: *DSP User's Manual*. Rosenstiel School of Marine and Atmospheric Science, University of Miami, Miami, Florida, 255 pp.
- Ryther, J.H., and C.S. Yentsch, 1957: The estimation of phytoplankton production in the ocean from chlorophyll and light data. *Limnol. Oceanogr.*, **2**, 281–286.
- S —
- Sagan, S., A.R. Weeks, I.S. Robinson, G. Moore, and J. Aiken, 1995: The relationship between beam attenuation and chlorophyll fluorescence and reflectance ratio in Antarctic waters. *Deep-Sea Res.*, **42**, 983–996.
- Sakshaug, E., K. Andresen, and D.A. Kiefer, 1989: A steady state description of growth and light absorption in the marine planktonic diatom *Skeletonema costatum*. *Limnol. Oceanogr.*, 198–205.
- Santorelli, R., S. Marullo, and E. Böhm, 1991: An objective analysis scheme for AVHRR imagery. *Int. J. Remote Sens.*, **12**, 681–693.
- Sarmiento, J.L., and M. Bender, 1994: Carbon biogeochemistry and climate change. *Photosynth. Res.*, 209–234.
- Sathyendranath, S., 1981: *Influence des substances en solution et en suspension dans les eaux de mer sur l'absorption et la reflectance. Modelisation et application à la télédétection*. Ph.D. Thesis, University of Paris, Paris, France, 123 pp., (in French).
- , L. Prieur, and A. Morel, 1989: A three-component model of ocean colour and its application to remote sensing of phytoplankton pigments in coastal waters. *Int. J. Rem. Sens.*, **10**, 1,373–1,394.
- , T. Platt, E.P.W. Horne, W.G. Harrison, O. Ulloa, R. Outerbridge, and N. Hoepffner, 1991: Estimation of new production in the ocean by compound remote sensing. *Nature*, 129–133.
- , F.E. Hoge, T. Platt, and R.N. Swift, 1994: Detection of phytoplankton pigments from ocean colour: Improved algorithms. *Appl. Opt.*, **33**, 1,081–1,089.
- Saunders, R.D., and J.B. Shumaker, 1977: The 1973 NBS Scale of Spectral Irradiance. *NBS Technical Note 594-13*, U.S. Department of Commerce, National Bureau of Standards, Washington, DC, 36 pp.

SeaWiFS Prelaunch Technical Report Series Final Cumulative Index

- Saunders, R.W., 1986: An automated scheme for the removal of cloud contamination for AVHRR radiances over western Europe. *Int. J. Remote Sens.*, **7**, 867–888.
- , 1989: A comparison of satellite-retrieved parameters with mesoscale model results. *Quart. J. Roy. Meteor. Soc.*, **115**, 551–572.
- , and K.T. Kriebel, 1988: An improved method for detecting clear sky and cloudy radiances from AVHRR data. *Int. J. Remote Sens.*, **9**, 123–150, *Errata*, ibid., **9**, 1,393–1,394.
- Savidge, G., and H.J. Lennon, 1987: Hydrography and phytoplankton distributions in north-west Scottish waters. *Cont. Shelf Res.*, **7**, 45–66.
- Schowengerdt, R.A., 1983: *Techniques for Image Processing and Classification in Remote Sensing*. Academic Press, 249 pp.
- Shaw, G.E., 1976: Error analysis of multiwavelength sun photometry. *Pure Appl. Geophys.*, **114**, 1–14.
- Shaw, P-S., B.C. Johnson, S.B. Hooker, and D. Lynch, 1996: The SeaWiFS Quality Monitor—a portable field calibration light source, *SPIE Vol. 2,963, Ocean Optics XIII*, 772–776.
- Shinn, J.A., R.P. Steinen, B.H. Lidz, and P.K. Swart, 1989: Whitings, a sedimentologic dilemma. *J. Sed. Petrol.*, **59**, 147–161.
- Siegel, D.A., C.R. Booth, and T.D. Dickey, 1986: Effects of sensor characteristics on the inferred vertical structure of the diffuse attenuation coefficient spectrum. *Ocean Optics VIII*, M.A. Blizzard, Ed., *SPIE*, **637**, 115–124.
- , and T.D. Dickey, 1987: Observations of the vertical structure of the diffuse attenuation coefficient spectrum. *Deep-Sea Res.*, **34**, 547–563.
- , and —, 1988: Characterization of high-frequency downwelling irradiance fluctuations. *Ocean Optics IX*, **925**, 67–74.
- , A.F. Michaels, J. Sorensen, M.C. O'Brien, and M. Hammer, 1995a: Seasonal variability of light availability and its utilization in the Sargasso Sea. *J. Geophys. Res.*, **100**, 8,695–8,713.
- , M.C. O'Brien, J.C. Sorensen, D. Konnoff, and E. Fields, 1995b: *BBOP Sampling and Data Processing Protocols*. U.S. JGOFS Planning and Coordination Office, Woods Hole, Massachusetts, 79 pp.
- , —, —, —, E.A. Brody, J.L. Mueller, C.O. Davis, W.J. Rhea, and S.B. Hooker, 1995c: Results of the SeaWiFS Data Analysis Round-Robin (DARR-94), July 1994. *NASA Tech. Memo. 104566, Vol. 26*, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 58 pp.
- Siegenthaler, U., and J.L. Sarmiento, 1993: Atmospheric carbon dioxide and the ocean. *Nature*, **365**, 119–125.
- Simpson, J.J., and C. Humphrey, 1990: An automated cloud screening algorithm for daytime Advanced Very High Resolution Radiometer imagery. *J. Geophys. Res.*, **95**, 13,459–13,481.
- Slater, P.N., and J.M. Palmer, 1991: Solar-diffuser panel and ratioing radiometer approach to satellite sensor on-board calibration. *Proc. SPIE*, **1,493**, 100–105.
- Slutz, R.J., S.J. Lubker, J.D. Hiscox, S.D. Woodruff, R.L. Jenne, P.M. Steurer, and J.D. Elms, 1985: *Comprehensive Ocean-Atmosphere Data Set; Release 1*. Climate Research Program, Boulder, Colorado, 263 pp.
- Smart, J.H., 1992: Empirical relationships between optical properties in the ocean. In: *Ocean Optics XI*, SPIE, **1,750**, 276–298.
- Smith, R.C., 1974: Structure of the solar radiation in the upper layers of the sea. *Optical Aspects of Oceanography*, N.G. Jerlov and E. Steemann-Nielsen, Eds., Academic Press, 95–119.
- , and K.S. Baker, 1978a: The bio-optical state of ocean waters and remote sensing. *Limnol. Oceanogr.*, **23**, 247–259.
- , and —, 1978b: Optical classification of natural waters. *Limnol. Oceanogr.*, **23**, 260–267.
- , and K.S. Baker, 1981: Optical properties of the clearest natural waters (200–800 nm). *Appl. Opt.*, **20**, 177–184.
- , —, and P. Dustan, 1981: Fluorometric techniques for the measurement of oceanic chlorophyll in the support of remote sensing. *SIO Ref. 81-17*, Scripps Institution of Oceanography, La Jolla, California, 14 pp.
- , and W.H. Wilson, 1981: Ship and satellite bio-optical research in the California Bight. *Oceanography from Space*, J.F.R. Gower, Ed., Plenum Press, 281–294.
- , R.W. Eppley, and K.S. Baker, 1982: Correlation of primary production as measured aboard ship in southern California coastal waters and as estimated from satellite chlorophyll images. *Mar. Biol.*, **66**, 281–288.
- , and K.S. Baker, 1984: Analysis of ocean optical data. *Ocean Optics VII*, M. Blizzard, Ed., *SPIE* **478**, 119–126.
- , C.R. Booth, and J.L. Star, 1984: Oceanographic bio-optical profiling system. *Appl. Opt.*, **23**, 2,791–2,797.
- , and —, 1985: Spatial and temporal patterns in pigment biomass in Gulf Stream Warm-Core Ring 82B and its environs. *J. Geophys. Res.*, **90**, 8,859–8,870.
- , and K.S. Baker, 1986: Analysis of ocean optical data. *Ocean Optics VIII*, P.N. Slater, Ed., *SPIE*, **637**, 95–107.
- , R. Bidigare, B. Prézelin, K. Baker, and J. Brooks, 1987a: Optical Characterization of Primary Productivity Across a Coastal Front. *Mar. Biol.*, **96**, 575–591.
- , O.B. Brown, F.E. Hoge, K.S. Baker, R.H. Evans, R.N. Swift, and W.E. Esaias, 1987b: Multiplatform sampling (ship, aircraft, and satellite) of a Gulf Stream warm core ring. *Appl. Optics*, **26**, 2,068–2,081.
- , X. Zhang, and J. Michaelsen, 1988: Variability of pigment biomass in the California Current system as determined by satellite imagery, 1. Spatial variability. *J. Geophys. Res.*, **93**, 10,863–10,882.
- , and K.S. and Baker, 1989: Stratospheric ozone, middle ultraviolet radiation and phytoplankton productivity. *Oceanogr.*, **2**, 4–10.
- , K.J. Waters, and K.S. Baker, 1991: Optical variability and pigment biomass in the Sargasso Sea as determined using deep-sea optical mooring data. *J. Geophys. Res.*, **96**, 8,665–8,686.

- , B.B. Prézelin, K.S. Baker, R.R. Bidigare, N.P. Boucher, T. Coley, D. Karentz, S. MacIntyre, H.A. Matlick, D. Menzies, M. Ondrusek, Z. Wan and K.J. Waters, 1992: Ozone depletion: Ultraviolet radiation and phytoplankton biology in Antarctic waters. *Science*, **255**, 952–959.
- Smith, S.L., W. Balch, K. Banse, W. Berelson, P. Brewer, O. Brown, K. Cochran, H. Livingston, M. Luther, C. McClain, D. Olson, L. Peterson, W. Peterson, W. Prell, L. Codispoti, A. Devol, H. Ducklow, R. Fine, G. Hitchcock, D. Lal, D. Repeta, E. Sherr, N. Surgi, J. Swallow, S. Wakeham, and K. Wishner, 1991: U.S. JGOFS: Arabian Sea Process Study. *U.S. JGOFS Planning Report No. 13*, Woods Hole Oceanographic Institution, Woods Hole, Massachusetts, 164 pp.
- Smith, W.L., P.K. Rao, R. Koffler, and W.P. Curtis, 1970: The determination of sea surface temperature from satellite high-resolution infrared window radiation measurements. *Mon. Wea. Rev.*, **98**, 604–611.
- Snyder, R.L., and J. Dera, 1970: Wave-induced light-field fluctuations in the sea. *J. Opt. Soc. Am.*, **60**, 1,072–1,079.
- Sørensen, B., 1981: *Recommendations of the 2<sup>nd</sup> international workshop on atmospheric correction of satellite observation of sea water colour*. March 30–April 1, Ispra, Italy, 49 pp.
- Sorensen, J.C., M. O'Brien, D. Konoff, and D.A. Siegel, 1994: The BBOP data processing system. *Ocean Optics XII*, J.S. Jaffe, Ed., *SPIE*, **2,258**, 539–546.
- Sosik, H.M., and B.G. Mitchell, 1995: Light absorption by phytoplankton, photosynthetic pigments, and detritus in the California Current System. *Deep-Sea Res.*, **42**, 1,717–1,748.
- Srokosz, M.A., M.J.R. Fasham, and P.G. Challenor, 1994: *Using SeaWiFS (ocean colour) data in biological ocean model validation and data assimilation*. Proposal to the UK SeaWiFS Exploitation Initiative, 10 pp.
- Stackpole, J.D., 1990: GRIB and BUFR: The only codes you will ever need. *Sixth Intl. Conf. on Interactive Information and Processing Systems for Meteorol., Oceanogr., and Hydrol.*, Am. Meteorol. Soc., Anaheim, California, 23–30.
- Stavn, R.H., and A.D. Weidemann, 1989: Shape factors, two-flow models, and the problem of irradiance inversion in estimating optical parameters. *Limnol. Oceanogr.*, **34**, 1,426–1,441.
- Steele, J.H., 1974: *The Structure of Marine Ecosystems*. Blackwell Scientific Publications, Oxford, England, 127 pp.
- , and E.W. Henderson, 1993: “The significance of interannual variability.” In: *Towards a Model of Biogeochemical Ocean Processes*, G.T. Evans and M.J.R. Fasham, Eds., Springer-Verlag, 237–260.
- Stone, R.S., G.L. Stephens, C.M.R. Platt, and S. Banks, 1990: The remote sensing of thin cirrus cloud using satellites, lidar and radiative transfer theory. *J. Appl. Meteor.*, **29**, 353–366.
- Stowe, L.L., C.G. Wellemeyer, T.F. Eck, H.Y.M. Yeh, and the Nimbus-7 Cloud Data Processing Team, 1988: Nimbus-7 global cloud climatology. *J. Climate*, **1**, 445–470.
- , E.P. McClain, R. Carey, P. Pellegrino, G. Gutman, P. Davis, C. Long, and S. Hart, 1991: Global distribution of cloud cover derived from NOAA/AVHRR operational satellite data. *Adv. Space Phys.*, **11**(3), 51–54.
- Stramski, D., 1990: Artifacts in measuring absorption spectra of phytoplankton collected on a filter. *Limnol. Oceanogr.*, **35**, 1,804–1,809.
- , C.R. Booth, and B.G. Mitchell, 1992: Estimation of the downward irradiance attenuation from a single mooring instrument. *Deep-Sea Res.*, **39**, 567–584.
- Strickland, J.D.H., 1958: Solar radiation penetrating the ocean: A review of requirements, data and methods of measurement, with particular reference to photosynthetic production. *J. Fish. Bd. Can.*, **15**, 453–493.
- , and T.R. Parsons, 1972: *A Practical Handbook of Sea Water Analysis*. Fish. Res. Board. Canada, 310 pp.
- Strub, P.T., C. James, A.C. Thomas, and M.R. Abbott, 1990: Seasonal and nonseasonal variability of satellite-derived surface pigment concentration in the California Current. *J. Geophys. Res.*, **95**, 11,501–11,530.
- Sturm, B., 1981: The atmospheric correction of remotely sensed data and the quantitative determination of suspended matter in marine water surface layers. *Rem. Sens. in Meteorol., Oceanogr., and Hydrol.*, A.P. Cracknell, Ed., John Wiley & Sons, 163–197.
- , 1993: CZCS data processing algorithms. *Ocean Colour: Theory and Applications in a Decade of CZCS Experience*, V. Barale and P.M. Schlittenhardt (Eds.), ECSC, EEC, EAEC, Brussels and Luxembourg, Kluwer Academic Publishers, Norwell, Massachusetts, 95–116.
- Subramaniam, A., and E.J. Carpenter, 1994: An empirically derived protocol for the detection of blooms of the marine cyanobacterium *Trichodesmium* using CZCS imagery. *Int. J. Remote Sens.*, **15**, 1,559–1,569.
- Sullivan, C.W., C.R. McClain, J.C. Comiso, and W.O. Smith, Jr., 1988: Phytoplankton standing crops within an Antarctic ice edge assessed by satellite remote sensing. *J. Geophys. Res.*, **93**, 12,487–12,498.
- , K.R. Arrigo, C.R. McClain, J.C. Comiso, and J.K. Firestone, 1993: Distributions of phytoplankton blooms in the Southern Ocean. *Science*, **262**, 1,832–1,837.
- T —
- Tassan, S., 1994: Local algorithms using SeaWiFS data for the retrieval of phytoplankton, pigments, suspended sediment, and yellow substance in coastal waters. *Appl. Opt.*, **33**, 2,369–2,378.
- Thiermann, V., and E. Ruprecht, 1992: A method for the detection of clouds using AVHRR infrared observations. *Int. J. Remote Sens.*, **13**, 1,829–1,841.
- Toll, R.F., Jr., and W.M. Clune, 1985: An operational evaluation of the Navy Operational Global Atmospheric Prediction System (NOGAPS): 48-hour surface pressure forecasts. *Mon. Wea. Rev.*, **113**, 1,433–1,440.
- Toratani, M., and H. Fukushima, 1993: Atmospheric correction scheme for ocean color remote sensing in consideration to Asian dust aerosol. *IGARSS '93*, Vol. 4, IEEE, New York, 1,937–1,940.

- Traganza, E., V. Silva, D. Austin, W. Hanson, and S. Bronsink, 1983: Nutrient mapping and recurrence of coastal upwelling centers by satellite remote sensing: Its implication to primary production and the sediment record. *Coastal Upwelling*, E. Suess and J. Thiede, Ed., Plenum Press, 61-83.
- Trees, C.C., M.C. Kennicutt, II, and J.M. Brooks, 1985: Errors associated with the standard fluorometric determination of chlorophylls and phaeopigments. *Mar. Chem.*, **17**, 1-12.
- , D.K. Clark, R. Bidigare, and M. Ondrusek, 1995: Chlorophyll *a* versus accessory pigment concentrations within the euphotic zone: A ubiquitous relationship? *Science*, (withdrawn).
- Tréguer, P., and G. Jacquès, 1992: Dynamics of nutrients and phytoplankton, and fluxes of carbon, nitrogen and silicon in the Antarctic Ocean. *Polar Bio.*, **12**, 149-162.
- Trenberth, K.E., and J.G. Olson, 1988: An evaluation and intercomparison of global analyses from the National Meteorological Center and the European Centre for Medium Range Weather Forecasts. *Bull. Am. Meteor. Soc.*, Boston, Massachusetts, **69**, 1,047-1,057.
- , W.G. Large, and J.G. Olson, 1990: The mean annual cycle in global ocean wind stress. *J. Phys. Oceanogr.*, **20**, 1,742-1,760.
- Tucker, C.J., and L.D. Miller, 1977: Soil spectra contributions to grass canopy spectral reflectance. *Photogramm., Eng., and Remote Sens.*, **721**-726.
- Turner, D.R., 1995: A biogeochemical study in the Bellingshausen Sea—Overview of the Sterna 1992 Expedition, *Deep-Sea Res.*, **42**, 907-932.
- Tyler, J.E., and R.C. Smith, 1970: *Measurements of Spectral Irradiance Underwater*. Gordon and Breach, 103 pp.
- Twomey, S., 1963: On the numerical solution of Fredholm integral equations of the first kind by the inversion of linear system produced by quadrature. *J. Assoc. Computer Machines*, **10**, 97-101.
- U —
- United States Navy, 1978: *Marine Climatic Atlas of the World; South Atlantic Ocean*, Vol. 4. NAVAIR 50-1C-531, US Government Printing Office, Washington, DC, 325 pp.
- University of Illinois at Urbana-Champaign, 1989: *NCSA HDF Specification*. 43 pp.
- , 1993: *NCSA HDF Calling Interfaces and Utilities, Version 3.2*. 121 pp.
- V —
- van de Hulst, W.G., 1957: *Light Scattering by Small Particles*, New York, Wiley, 470 pp.
- Viollier, M., 1982: Radiance calibration of the Coastal Zone Color Scanner: a proposed adjustment. *Appl. Opt.*, **21**, 1,142-1,145.
- , D. Tanré, and P.Y. Deschamps, 1980: An algorithm for remote sensing of water color from space. *Bound.-Layer Meteor.*, **18**, 247-267.
- Volk, T., and M.I. Hoffert, 1985: "Ocean carbon pumps: Analysis of relative strengths and efficiencies in ocean-driven atmospheric CO<sub>2</sub> exchanges." In: *The Carbon Cycle and Atmospheric CO<sub>2</sub>: Natural Variations Archean to Present*, E.T. Sunquist and W.S. Broeker., Eds., American Geophysical Union, Washington, DC, 99-110.
- Voss, K.J., 1989: Use of the radiance distribution to measure the optical absorption coefficient in the ocean. *Limnol. Oceanogr.*, **34**, 1,614-1,622.
- , J.W. Nolten, and G.D. Edwards, 1986: Ship shadow effects on apparent optical properties. *Ocean Optics VIII*, M. Blizard, Ed., SPIE, **637**, 186-190.
- , and G. Zibordi, 1989: Radiometric and geometric calibration of a spectral electro-optic "fisheye" camera radiance distribution system. *J. of Atmos. and Ocean. Technol.*, **6**, 652-662.
- W —
- Walker, J.H., R.D. Saunders, J.K. Jackson, and D.A. McSparron, 1987a: *Spectral Irradiance Calibrations*. NBS Special Publication 250-20, U.S. Dept. of Commerce, National Bureau of Standards, Washington, DC, 37 pp. plus appendices.
- , —, A.T. Hattenburg, 1987b: *Spectral Radiance Calibrations*. NBS Special Publication 250-1, U.S. Dept. of Commerce, National Bureau of Standards, Washington, DC, 26 pp., plus appendices.
- , C.L. Cromer, and J.T. McLean, 1991: Technique for improving the calibration of large-area sphere sources. *Ocean Optics*, B.W. Guenther, Ed., SPIE, **1493**, 224-230.
- Walsh, J.J., G.T. Rowe, R.L. Iverson, and C.P. McRoy, 1981: Biological export of shelf carbon is a sink of the global CO<sub>2</sub> cycle. *Nature*, **291**, 196-201.
- Walters, N.M., 1983: *Coastal zone colour scanner (CZCS) algorithm description for the South African coastal waters*. Internal report, NPRL Div. of Optical Sciences, Pretoria, S. Africa, 30 pp.
- Warneck, P., 1988: *Chemistry of the Natural Atmosphere*. Academic Press, 757 pp.
- Waters, K.J., R.C. Smith, and M.R. Lewis, 1990: Avoiding ship induced light field perturbation in the determination of oceanic optical properties. *Oceanogr.*, **3**, 18-21.
- Weare, B.C., 1992: A comparison of the ISCCP C1 cloud amounts with those derived from high resolution AVHRR images. *Int. J. Remote Sens.*, **13**, 1,965-1,980.
- Weinreb, M.P., G. Hamilton, S. Brown, and R.J. Koczor, 1990: Nonlinear corrections in calibration of Advanced Very High Resolution Radiometer infrared channels. *J. Geophys. Res.*, **95**, 7,381-7,388.
- Weir, C., D.A. Siegel, A.F. Michaels, and D. Menzies, 1994: An *in situ* evaluation of a ship's shadow. *Ocean Optics XII*, SPIE, **2,258**, 815-821.
- Weller, M., and U. Leiterer, 1988: Experimental data on spectral aerosol optical thickness and its global distribution. *Beitr. Phys. Atmos.*, **61**, 1-9.

- Wertz, J.R. (Ed.), 1978: *Spacecraft Attitude Determination and Control*. D. Reidel, Dordrecht, Holland, 858 pp.
- Westphal, T.L., Y. Ge, and S.B. Hooker, 1994: "The SBRC Database." In: Hooker, S.B., C.R. McClain, J.K. Firestone, T.L. Westphal, E-n. Yeh, and Y. Ge: The SeaWiFS Bio-Optical Archive and Storage System (SeaBASS), Part 1. *NASA Tech. Memo. 104566, Vol. 20*, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 31-34.
- Williams, S.P., E.F. Szajna, and W.A. Hovis, 1985a: Nimbus 7 Coastal Zone Color Scanner (CZCS) Level 1 Data Product Users' Guide. *NASA Tech. Memo. 86203*, NASA Goddard Space Flight Center, Greenbelt, Maryland, 49 pp.
- , —, and —, 1985b: Nimbus 7 Coastal Zone Color Scanner (CZCS), Level 2 Data Product Users' Guide. *NASA Tech. Memo. 86202*, NASA Goddard Space Flight Center, Greenbelt, Maryland, 57 pp.
- Wilson, A.K., 1994a: The NERC Integrated ATM/CASI/GPS System. *Proc. First Int. Airborne Remote Sens. Conf. and Exhibition—“Applications, Technology, and Science: Today’s Progress for Tomorrow’s Needs,”* 11–15 September, 1994, Strasbourg, France, (ERIM), 249–259.
- , 1994b: First deployment of a ground-based instrument to retrieve atmospheric optical parameters and surface BRDF during the HAPEX-Sahel experiment, Niger 1992. *The ISPRS Sixth Int. Sympos. Physical Measurements and Signatures in Remote Sens.*, 17–21 January 1994, Val D’Isère, France, (ISPRS), 739–746.
- Wilson, W.H., R.C. Smith, and J.W. Nolten, 1981: The CZCS Geolocation Algorithms. *SIO Ref. 81-32*, Scripps Institution of Oceanography, La Jolla, California, 37 pp.
- Woodruff, S.D., R.J. Slutz, R.L. Jenne, and P.M. Steurer, 1987: A comprehensive ocean-atmosphere data set. *Bull. Am. Meteor. Soc.*, **68**, 1,239–1,250.
- Woodward, R.H., J. Firestone, and C.R. McClain, 1992: Progress report on AVHRR/Pathfinder activities. Internal document submitted to Pathfinder Project, NASA Goddard Space Flight Center, Greenbelt, Maryland, 14 pp.
- , R.A. Barnes, C.R. McClain, W.E. Esaias, W.L. Barnes, and A.T. Mecherikunnel, 1993: Modeling of the SeaWiFS Solar and Lunar Observations. *NASA Tech. Memo. 104566, Vol. 10*, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 26 pp.
- Woodwell, G.M., R.H. Whittaker, W.A. Reiners, G.E. Likens, C.C. Delwiche, and D.B. Botkin, 1978: The biota and the world carbon budget. *Science*, 141–146.
- World Meteorological Organization, 1990: Report of the International Ozone Trends Panel, 1988: *World Meteorological Organization Global Ozone Research and Monitoring Project, Report No. 18, 2 Vols.*, Geneva, Switzerland.
- Wright, S.W., S.W. Jeffrey, R.F.C. Mantoura, C.A. Llewellyn, T. Bjornland, D. Repeta, and N. Welschmeyer, 1991: Improved HPLC method for the analysis of chlorophylls and carotenoids from marine phytoplankton. *Mar. Ecol. Prog. Ser.*, **77**, 183–196.
- Wroblewski, J.S., J.L. Sarmiento, and G.R. Flierl, 1988: An ocean basin scale model of plankton dynamics in the North Atlantic 1. solutions for the climatological oceanographic conditions in May. *Global Biogeochem. Cycles*, **2**, 199–218.
- Wu, M.C., 1985: Remote sensing of cloud-top pressure using reflected solar radiation in the oxygen A-band. *J. Climate Appl. Meteorol.*, **24**, 540–546.
- Wu, R., J.A. Weinman, and R.T. Chin, 1985: Determination of rainfall rates from GOES satellite images by a pattern recognition technique. *J. Atmos. Ocean. Technol.*, **2**, 314–330.
- Wyatt, C.L., 1978: *Radiometric Calibration: Theory and Methods*. Academic Press, 200 pp.
- Wyman, M., 1992: An *in vivo* method for the estimation of phycoerythrin concentrations in marine cyanobacteria. *Limnol. Oceanogr.*, **37**, 1,300–1,306.
- X, Y —
- Yamanouchi, T., and S. Kawaguchi, 1992: Cloud distribution in the Antarctic from AVHRR data and radiation measurements at the surface. *Int. J. Remote Sens.*, **13**, 111–127.
- Yapp, C.J., 1992: Ancient atmospheric CO<sub>2</sub> pressures inferred from natural goethites. *Nature*, 342–344.
- Yentsch, C.S., 1983: Remote Sensing of Biological Substances. *Remote Sensing Applications in Marine Science and Technology*, A.P. Cracknell, Ed., D. Reidel Publishing Co., 263–297.
- , 1990: Estimates of ‘new production’ in the Mid-North Atlantic. *J. Plankton Res.*, **12**, 717–734.
- , and D.W. Menzel, 1963: A method for the determination of phytoplankton, chlorophyll, and phaeophytin by fluorescence. *Deep-Sea Res.*, **10**, 221–231.
- , and D.A. Phinney, 1985: Rotary motion and convection as a means of regulating primary production in warm core rings. *J. Geophys. Res.*, **90**, 3,237–3,248.
- Yoder, J.A., L.P. Atkinson, S.S. Bishop, J.O. Blanton, T.N. Lee, and L.J. Pietrafesa, 1985: Phytoplankton dynamics within Gulf Stream intrusions on the southeastern United States Continental shelf during summer, 1991. *Cont. Shelf Res.*, 611–635.
- , C.R. McClain, J.O. Blanton, and L.-Y. Oey, 1987: Spatial scales in CZCS-chlorophyll imagery of the southeastern U.S. continental shelf. *Limnol. Oceanogr.*, **32**, 929–941.
- , C.R. McClain, G.C. Feldman, and W.E. Esaias, 1993: Annual cycles of phytoplankton chlorophyll concentrations in the global ocean: A satellite view. *Global Biogeochem. Cycles*, 181–193.
- Z —
- Zalewski, E.F., and C.R. Duda, 1983: Silicon photodiode device with 100% external quantum efficiency. *Appl. Opt.*, **22**, 2,867–2,873.
- Zaneveld, J.R.V., 1995: Zaneveld, J.R.V., 1995: A theoretical deviation of the dependence of the remotely sensed reflectance of the ocean on the inherent optical-properties. *J. Geophys. Res.*, **100**, 13,135–13,142.

SeaWiFS Prelaunch Technical Report Series Final Cumulative Index

- , J.C. Kitchen, A. Bricaud, and C. Moore, 1992: Analysis in *in situ* spectral absorption meter data. *Ocean Optics XI*, G.D. Gilbert, Ed., SPIE, **1750**, 187–200.
- , —, and J.L. Mueller, 1993: Vertical structure of productivity and its vertical integration as derived from remotely sensed observations. *Limnol. Oceanogr.*, **38**, 1,384–1,393.
- Zibordi, G., and G.M. Ferrari, 1995: Instrument self-shading in underwater optical measurements: experimental data. *Appl. Opt.*, **34**, 2,750–2,754.

THE SEAWIFS TECHNICAL REPORT SERIES

Vol. 1

Hooker, S.B., W.E. Esaias, G.C. Feldman, W.W. Gregg, and C.R. McClain, 1992: An Overview of SeaWiFS and Ocean Color. *NASA Tech. Memo. 104566, Vol. 1*, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 24 pp., plus color plates.

Vol. 2

Gregg, W.W., 1992: Analysis of Orbit Selection for SeaWiFS: Ascending vs. Descending Node. *NASA Tech. Memo. 104566, Vol. 2*, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 16 pp.

Vol. 3

McClain, C.R., W.E. Esaias, W. Barnes, B. Guenther, D. Endres, S.B. Hooker, G. Mitchell, and R. Barnes, 1992: Calibration and Validation Plan for SeaWiFS. *NASA Tech. Memo. 104566, Vol. 3*, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 41 pp.

Vol. 4

McClain, C.R., E. Yeh, and G. Fu, 1992: An Analysis of GAC Sampling Algorithms: A Case Study. *NASA Tech. Memo. 104566, Vol. 4*, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 22 pp., plus color plates.

Vol. 5

Mueller, J.L., and R.W. Austin, 1992: Ocean Optics Protocols for SeaWiFS Validation. *NASA Tech. Memo. 104566, Vol. 5*, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 43 pp.

Vol. 6

Firestone, E.R., and S.B. Hooker, 1992: SeaWiFS Technical Report Series Cumulative Index: Volumes 1-5. *NASA Tech. Memo. 104566, Vol. 6*, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 9 pp.

Vol. 7

Darzi, M., 1992: Cloud Screening for Polar Orbiting Visible and IR Satellite Sensors. *NASA Tech. Memo. 104566, Vol. 7*, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 7 pp.

Vol. 8

Hooker, S.B., W.E. Esaias, and L.A. Rexrode, 1993: Proceedings of the First SeaWiFS Science Team Meeting. *NASA Tech. Memo. 104566, Vol. 8*, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 61 pp.

Vol. 9

Gregg, W.W., F.C. Chen, A.L. Mezaache, J.D. Chen, J.A. Whiting, 1993: The Simulated SeaWiFS Data Set, Version 1. *NASA Tech. Memo. 104566, Vol. 9*, S.B. Hooker, E.R. Firestone, and A.W. Indest, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 17 pp.

Vol. 10

Woodward, R.H., R.A. Barnes, C.R. McClain, W.E. Esaias, W.L. Barnes, and A.T. Mecherikunnel, 1993: Modeling of the SeaWiFS Solar and Lunar Observations. *NASA Tech. Memo. 104566, Vol. 10*, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 26 pp.

Vol. 11

Patt, F.S., C.M. Hoisington, W.W. Gregg, and P.L. Coronado, 1993: Analysis of Selected Orbit Propagation Models for the SeaWiFS Mission. *NASA Tech. Memo. 104566, Vol. 11*, S.B. Hooker, E.R. Firestone, and A.W. Indest, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 16 pp.

Vol. 12

Firestone, E.R., and S.B. Hooker, 1993: SeaWiFS Technical Report Series Cumulative Index: Volumes 1-11. *NASA Tech. Memo. 104566, Vol. 12*, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 28 pp.

Vol. 13

McClain, C.R., K.R. Arrigo, J. Comiso, R. Fraser, M. Darzi, J.K. Firestone, B. Schieber, E-n. Yeh, and C.W. Sullivan, 1994: Case Studies for SeaWiFS Calibration and Validation, Part 1. *NASA Tech. Memo. 104566, Vol. 13*, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 52 pp., plus color plates.

Vol. 14

Mueller, J.L., 1993: The First SeaWiFS Intercalibration Round-Robin Experiment, SIRREX-1, July 1992. *NASA Tech. Memo. 104566, Vol. 14*, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 60 pp.

Vol. 15

Gregg, W.W., F.S. Patt, and R.H. Woodward, 1994: The Simulated SeaWiFS Data Set, Version 2. *NASA Tech. Memo. 104566, Vol. 15*, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 42 pp., plus color plates.

Vol. 16

Mueller, J.L., B.C. Johnson, C.L. Cromer, J.W. Cooper, J.T. McLean, S.B. Hooker, and T.L. Westphal, 1994: The Second SeaWiFS Intercalibration Round-Robin Experiment, SIRREX-2, June 1993. *NASA Tech. Memo. 104566, Vol. 16*, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 121 pp.

Vol. 17

Abbott, M.R., O.B. Brown, H.R. Gordon, K.L. Carder, R.E. Evans, F.E. Müller-Karger, and W.E. Esaias, 1994: Ocean Color in the 21st Century: A Strategy for a 20-Year Time Series. *NASA Tech. Memo. 104566, Vol. 17*, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 20 pp.

Vol. 18

Firestone, E.R., and S.B. Hooker, 1995: SeaWiFS Technical Report Series Cumulative Index: Volumes 1-17. *NASA Tech. Memo. 104566, Vol. 18*, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 47 pp.

## SeaWiFS Prelaunch Technical Report Series Final Cumulative Index

### Vol. 19

McClain, C.R., R.S. Fraser, J.T. McLean, M. Darzi, J.K. Firestone, F.S. Patt, B.D. Schieber, R.H. Woodward, E-n. Yeh, S. Mattoo, S.F. Biggar, P.N. Slater, K.J. Thome, A.W. Holmes, R.A. Barnes, and K.J. Voss, 1994: Case Studies for SeaWiFS Calibration and Validation, Part 2. *NASA Tech. Memo. 104566, Vol. 19*, S.B. Hooker, E.R. Firestone, and J.G. Acker, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 73 pp.

### Vol. 20

Hooker, S.B., C.R. McClain, J.K. Firestone, T.L. Westphal, E-n. Yeh, and Y. Ge, 1994: The SeaWiFS Bio-Optical Archive and Storage System (SeaBASS), Part 1. *NASA Tech. Memo. 104566, Vol. 20*, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 40 pp.

### Vol. 21

Acker, J.G., 1994: The Heritage of SeaWiFS: A Retrospective on the CZCS NIMBUS Experiment Team (NET) Program. *NASA Tech. Memo. 104566, Vol. 21*, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 43 pp.

### Vol. 22

Barnes, R.A., W.L. Barnes, W.E. Esaias, and C.R. McClain, 1994: Prelaunch Acceptance Report for the SeaWiFS Radiometer. *NASA Tech. Memo. 104566, Vol. 22*, S.B. Hooker, E.R. Firestone, and J.G. Acker, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 32 pp.

### Vol. 23

Barnes, R.A., A.W. Holmes, W.L. Barnes, W.E. Esaias, C.R. McClain, and T. Svitek, 1994: SeaWiFS Prelaunch Radiometric Calibration and Spectral Characterization. *NASA Tech. Memo. 104566, Vol. 23*, S.B. Hooker, E.R. Firestone, and J.G. Acker, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 55 pp.

### Vol. 24

Firestone, E.R., and S.B. Hooker, 1995: SeaWiFS Technical Report Series Cumulative Index: Volumes 1-23. *NASA Tech. Memo. 104566, Vol. 24*, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 36 pp.

### Vol. 25

Mueller, J.L., and R.W. Austin, 1995: Ocean Optics Protocols for SeaWiFS Validation, Revision 1. *NASA Tech. Memo. 104566, Vol. 25*, S.B. Hooker, E.R. Firestone, and J.G. Acker, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 66 pp.

### Vol. 26

Siegel, D.A., M.C. O'Brien, J.C. Sorensen, D.A. Konnoff, E.A. Brody, J.L. Mueller, C.O. Davis, W.J. Rhea, and S.B. Hooker, 1995: Results of the SeaWiFS Data Analysis Round-Robin (DARR-94), July 1994. *NASA Tech. Memo. 104566, Vol. 26*, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 58 pp.

### Vol. 27

Mueller, J.L., R.S. Fraser, S.F. Biggar, K.J. Thome, P.N. Slater, A.W. Holmes, R.A. Barnes, C.T. Weir, D.A. Siegel, D.W. Menzies, A.F. Michaels, and G. Podesta, 1995: Case Studies for SeaWiFS Calibration and Validation, Part 3. *NASA Tech. Memo. 104566, Vol. 27*, S.B. Hooker, E.R. Firestone, and J.G. Acker, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 46 pp.

### Vol. 28

McClain, C.R., K.R. Arrigo, W.E. Esaias, M. Darzi, F.S. Patt, R.H. Evans, J.W. Brown, C.W. Brown, R.A. Barnes, and L. Kumar, 1995: SeaWiFS Algorithms, Part 1. *NASA Tech. Memo. 104566, Vol. 28*, S.B. Hooker, E.R. Firestone, and J.G. Acker, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 38 pp., plus color plates.

### Vol. 29

Aiken, J., G.F. Moore, C.C. Trees, S.B. Hooker, and D.K. Clark, 1995: The SeaWiFS CZCS-Type Pigment Algorithm. *NASA Tech. Memo. 104566, Vol. 29*, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 34 pp.

### Vol. 30

Firestone, E.R., and S.B. Hooker, 1996: SeaWiFS Technical Report Series Cumulative Index: Volumes 1-29. *NASA Tech. Memo. 104566, Vol. 30*, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 43 pp.

### Vol. 31

Barnes, R.A., A.W. Holmes, and W.E. Esaias, 1995: Stray Light in the SeaWiFS Radiometer. *NASA Tech. Memo. 104566, Vol. 31*, S.B. Hooker, E.R. Firestone, and J.G. Acker, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 76 pp.

### Vol. 32

Campbell, J.W., J.M. Blaisdell, and M. Darzi, 1995: Level-3 SeaWiFS Data Products: Spatial and Temporal Binning Algorithms. *NASA Tech. Memo. 104566, Vol. 32*, S.B. Hooker, E.R. Firestone, and J.G. Acker, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 73 pp., plus color plates.

### Vol. 33

Moore, G.F., and S.B. Hooker, 1996: Proceedings of the First SeaWiFS Exploitation Initiative (SEI) Team Meeting. *NASA Tech. Memo. 104566, Vol. 33*, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 53 pp.

### Vol. 34

Mueller, J.L., B.C. Johnson, C.L. Cromer, S.B. Hooker, J.T. McLean, and S.F. Biggar, 1996: The Third SeaWiFS Intercalibration Round-Robin Experiment (SIRREX-3), 19-30 September 1994. *NASA Tech. Memo. 104566, Vol. 34*, S.B. Hooker, E.R. Firestone, and J.G. Acker, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 78 pp.

### Vol. 35

Robins, D.B., A.J. Bale, G.F. Moore, N.W. Rees, S.B. Hooker, C.P. Gallienne, A.G. Westbrook, E. Marañón, W.H. Spooner, and S.R. Laney, 1996: AMT-1 Cruise Report and Preliminary Results. *NASA Tech. Memo. 104566, Vol. 35*, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 87 pp.

### Vol. 36

Firestone, E.R., and S.B. Hooker, 1996: SeaWiFS Technical Report Series Cumulative Index: Volumes 1-35. *NASA Tech. Memo. 104566, Vol. 36*, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 55 pp.

Vol. 37

Johnson, B.C., S.S. Bruce, E.A. Early, J.M. Houston, T.R. O'Brian, A. Thompson, S.B. Hooker, and J.L. Mueller, 1996: The Fourth SeaWiFS Intercalibration Round-Robin Experiment (SIRREX-4), May 1995. *NASA Tech. Memo. 104566*, Vol. 37, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 65 pp.

Vol. 38

McClain, C.R., M. Darzi, R.A. Barnes, R.E. Eplee, J.K. Firestone, F.S. Patt, W.D. Robinson, B.D. Schieber, R.H. Woodward, and E-n. Yeh, 1996: SeaWiFS Calibration and Validation Quality Control Procedures. *NASA Tech. Memo. 104566*, Vol. 38, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 68 pp.

Vol. 39

Barnes, R.A., E-n. Yeh, and R.E. Eplee, 1996: SeaWiFS Calibration Topics, Part 1. *NASA Tech. Memo. 104566*, Vol. 39, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 66 pp.

Vol. 40

Barnes, R.A., R.E. Eplee, Jr., E-n. Yeh, and W.E. Esaias, 1997: SeaWiFS Calibration Topics, Part 2. *NASA Tech. Memo. 104566*, Vol. 40, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 67 pp.

Vol. 41

Yeh, E-n., R.A. Barnes, M. Darzi, L. Kumar, E.A. Early, B.C. Johnson, and J.L. Mueller, 1997: Case Studies for SeaWiFS Calibration and Validation, Part 4. *NASA Tech. Memo. 104566*, Vol. 41, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 35 pp.

Vol. 42

Falkowski, P.G., M.J. Behrenfeld, W.E. Esaias, W. Balch, J.W. Campbell, R.L. Iverson, D.A. Kiefer, A. Morel, and J.A. Yoder, 1998: Satellite Primary Productivity Data and Algorithm Development: A Science Plan for Mission to Planet Earth. *NASA Tech. Memo. 1998-104566*, Vol. 42, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 36 pp.

Vol. 43

Firestone, E.R., and S.B. Hooker, 1998: SeaWiFS Prelaunch Technical Report Series Final Cumulative Index. *NASA Tech. Memo. 1998-104566*, Vol. 43, S.B. Hooker and E.R. Firestone, Eds., NASA Goddard Space Flight Center, Greenbelt, Maryland, 69 pp.





REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188
<p>Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.</p>			
1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE April 1998	3. REPORT TYPE AND DATES COVERED Technical Memorandum	
4. TITLE AND SUBTITLE  SeaWiFS Technical Report Series Volume 43: SeaWiFS Prelaunch Technical Report Series Final Cumulative Index		5. FUNDING NUMBERS  Code 970.2	
6. AUTHOR(S) Elaine R. Firestone and Stanford B. Hooker  Series Editors: Stanford B. Hooker and Elaine R. Firestone			
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS (ES)  Laboratory for Hydrospheric Processes Goddard Space Flight Center Greenbelt, Maryland 20771		8. PERFORMING ORGANIZATION REPORT NUMBER  98B00047	
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS (ES)  National Aeronautics and Space Administration Washington, DC 20546-0001		10. SPONSORING / MONITORING AGENCY REPORT NUMBER  NASA/TM-1998-104566, Vol. 43	
11. SUPPLEMENTARY NOTES  E.R. Firestone: General Sciences Corporation, Laurel, Maryland			
12a. DISTRIBUTION / AVAILABILITY STATEMENT  Unclassified-Unlimited Subject Category: 48 Report available from the NASA Center for AeroSpace Information, 7121 Standard Drive, Hanover, MD 21076-1320. (301) 621-0390.		12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words)  The Sea-viewing Wide Field-of-view Sensor (SeaWiFS) is the follow-on ocean color instrument to the Coastal Zone Color Scanner (CZCS), which ceased operations in 1986, after an eight-year mission. SeaWiFS was launched on 1 August 1997, on the SeaStar satellite, built by Orbital Sciences Corporation (OSC). The SeaWiFS Project at the National Aeronautics and Space Administration (NASA) Goddard Space Flight Center (GSFC), undertook the responsibility of documenting all aspects of this mission, which is critical to the ocean color and marine science communities. This documentation, entitled the <i>SeaWiFS Technical Report Series</i> , is in the form of NASA Technical Memorandum Number 104566 and 1998-104566. All reports published are volumes within the series. This particular volume, which is the last of the so-called <i>Prelaunch Series</i> serves as a reference, or guidebook, to the previous 42 volumes and consists of 6 sections including: an addenda, an errata, an index to key words and phrases, lists of acronyms and symbols used, and a list of all references cited. The editors have published a cumulative index of this type after every five volumes. Each index covers the reference topics published in all previous editions, that is, each new index includes all of the information contained in the preceeding indexes with the exception of any addenda			
14. SUBJECT TERMS SeaWiFS, Oceanography, Cumulative, Index, Summary, Overview, Errata, Addenda, Glossary, Symbols, References, Bio-optical Algorithm Mini-workshop, Science Team Meeting		15. NUMBER OF PAGES 69	16. PRICE CODE
17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT UL